THE IRON AGE

Established 1855 New York, July 9, 1914 *Vol. 94: No. 2*

The New N. & G. Taylor Tin-Plate Works

The Additions to the Steel Plant at Cumberland, Md., Which Make It an Independent, Self-Contained Tin-Plate Mill

With the completion of extensive additions to the works of the N. & G. Taylor Company at Cumberland, Md., a good example of an independent, self-contained plant completely equipped for the manufacture of tin plate from pig iron to finished sheets is obtained. The works are located at South Cumberland, Md., and are reached by both the Baltimore & Ohio and Western Maryland railroads. Connection is also made with the Pennsylvania Railroad by means of a short transfer across town. The property covers some ten acres, located on high ground overlooking the Potomac River and the Chesapeake & Ohio canal. The plant consists of open-hearth furnaces, rolling mills, black plate mills and tin house.

Casting the Ingots, Bottom Poured in Groups

THE OPEN-HEARTH DEPARTMENT.

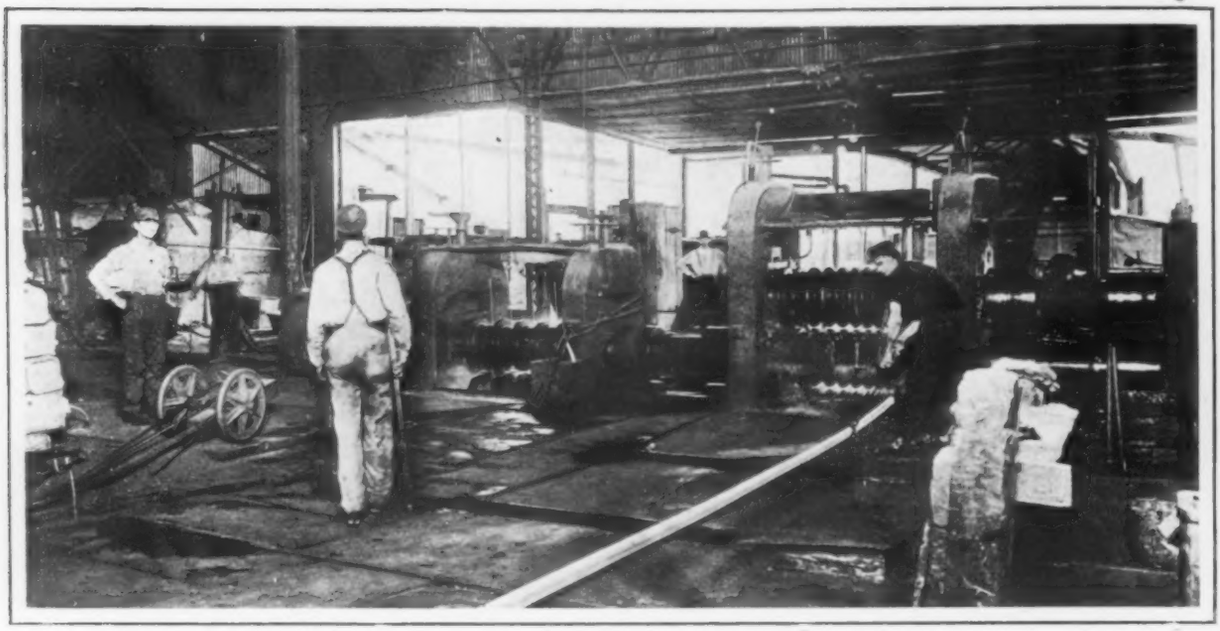
In the open-hearth department three 25-ton basic open-hearth furnaces provide the supply of steel for the plant. On the charging side the furnaces are served by a Wellman-Seaver-Morgan standard high-type 4-motor charging machine with the proper complement of charging-boxes and trucks hauled by a narrow-gage locomotive. Pig iron and scrap are handled by means of a 15-ton 8-wheel Orton & Steinbrenner locomotive crane, with 45-ft. boom and an Electric Controller & Mfg. Company's lifting-magnet. On the casting side the furnaces are served by one Alliance Machine Company 4-motor mill type crane of 40 tons capacity on the main hoist, and 7½ tons on the auxiliary. There is also one 35-ton Morgan crane with a 5-ton auxiliary hoist and also one Case crane with a 25-ton main hoist and 5000-lb. auxiliary. Thirty-ton ladles there are to take the steel from the furnaces to the casting-pits, the steel being bottom poured in small ingots.

THE BAR MILL

The ingots from the open-hearth are re-heated in a continuous heating furnace preparatory to being rolled into bars on a 24-in. 2-high roughing-stand, and a 3-high finishing mill built by the United Engineering & Foundry Company. This mill is driven by a 32 x 48-in. 750-hp. Hamilton Corliss engine. The finished bars are carried on an automatic motor-driven run-out table to a No. 2 vertical motor-driven shear built by the United Engineering & Foundry Company especially for the purpose of cutting these bars accurately to short lengths. After shearing, the bars drop into a water-bosh from which they are carried automatically by chain conveyor to the transfer-buggies, and are thence distributed to the various hot mills in the black plate department. A new size-E Long & Alstatter motor-driven shear is being installed to cut heavier sections of bars. This shear will have a capacity for shearing bars up to 8 in. x 2½ in.

THE BLACK PLATE DEPARTMENT

This is divided into two sections, the first containing three 26 x 30-in. hot mills and two 26 x 32-in. hot mills, direct connected to a 38 x 60-in. Rarig

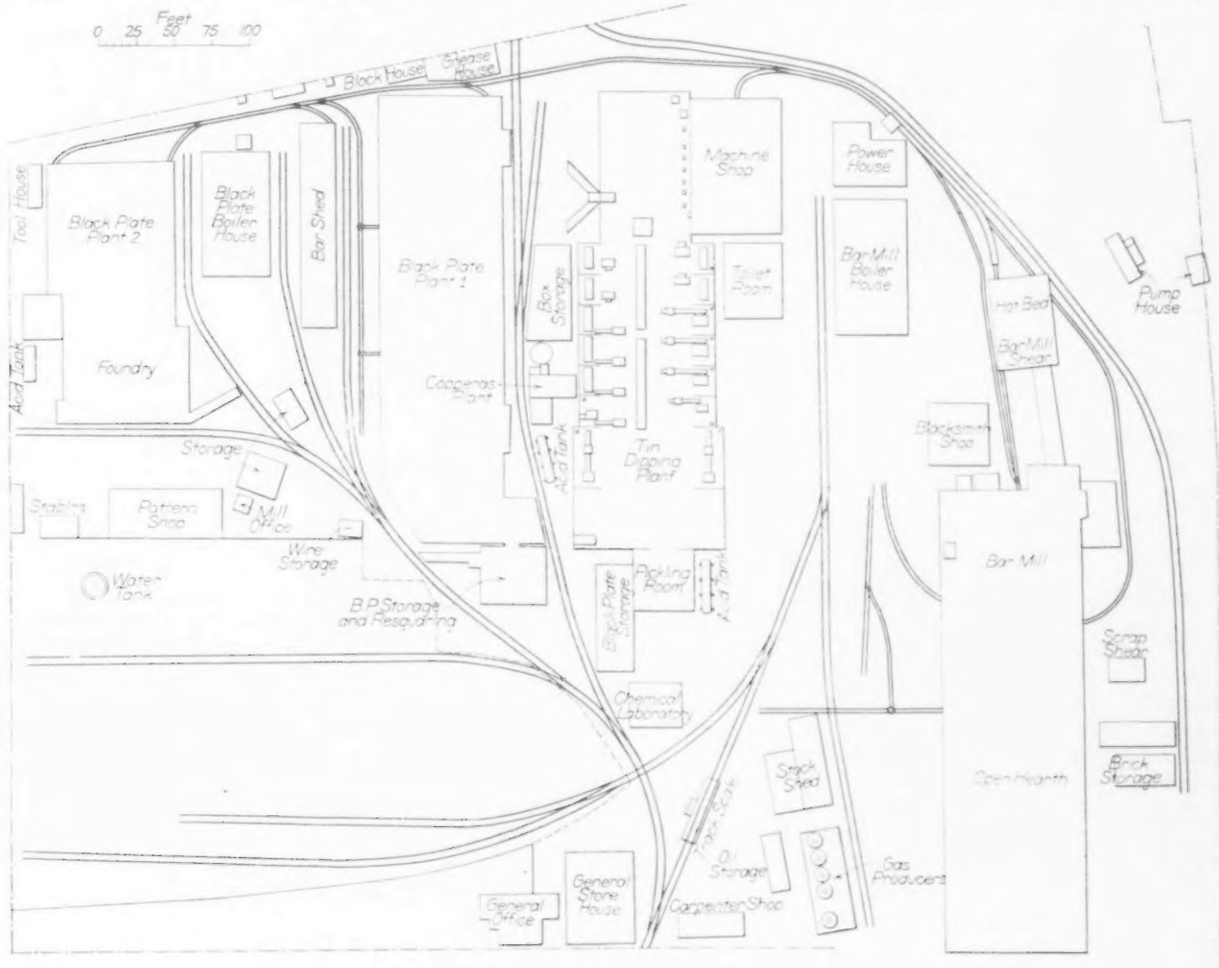


General View of the Bar Mill

Corliss engine. These mills are served by a Mesta high type pickling machine, 3 direct-fired annealing furnaces and four stands of 22 x 32-in. cold rolls, direct-connected to a 150-hp. Rarig Corliss engine. The other department has three 26 x 30-in. hot mills, direct-connected to a 450-hp. Rarig Corliss engine, and also two stands of 22 x 32-in. cold rolls on the same train. A standard 3-arm high-type Mesta pickling machine is used, together with 2 direct-fired annealing-furnaces, and the usual equipment of heating furnaces. Two boiler-houses furnish the steam for the plant, equipped with 72-in. x 20-ft. return tubular boilers, with feed water heaters of 2500-hp. capacity of the open type, built by the Hoppes Mfg. Company. The boiler feed pumps are duplex built by the Epping-Carpenter Company and the Laidlaw-Dunn-Gordon Company.

THE NEW TIN HOUSE

From the black plate mills, the finished sheets are transferred by a monorail conveyor to the dipping plant or tin-house, a distance of about 135 ft. This conveyor is a Shepard monorail electric hoist of 3 tons capacity, equipped with a trailer cage.

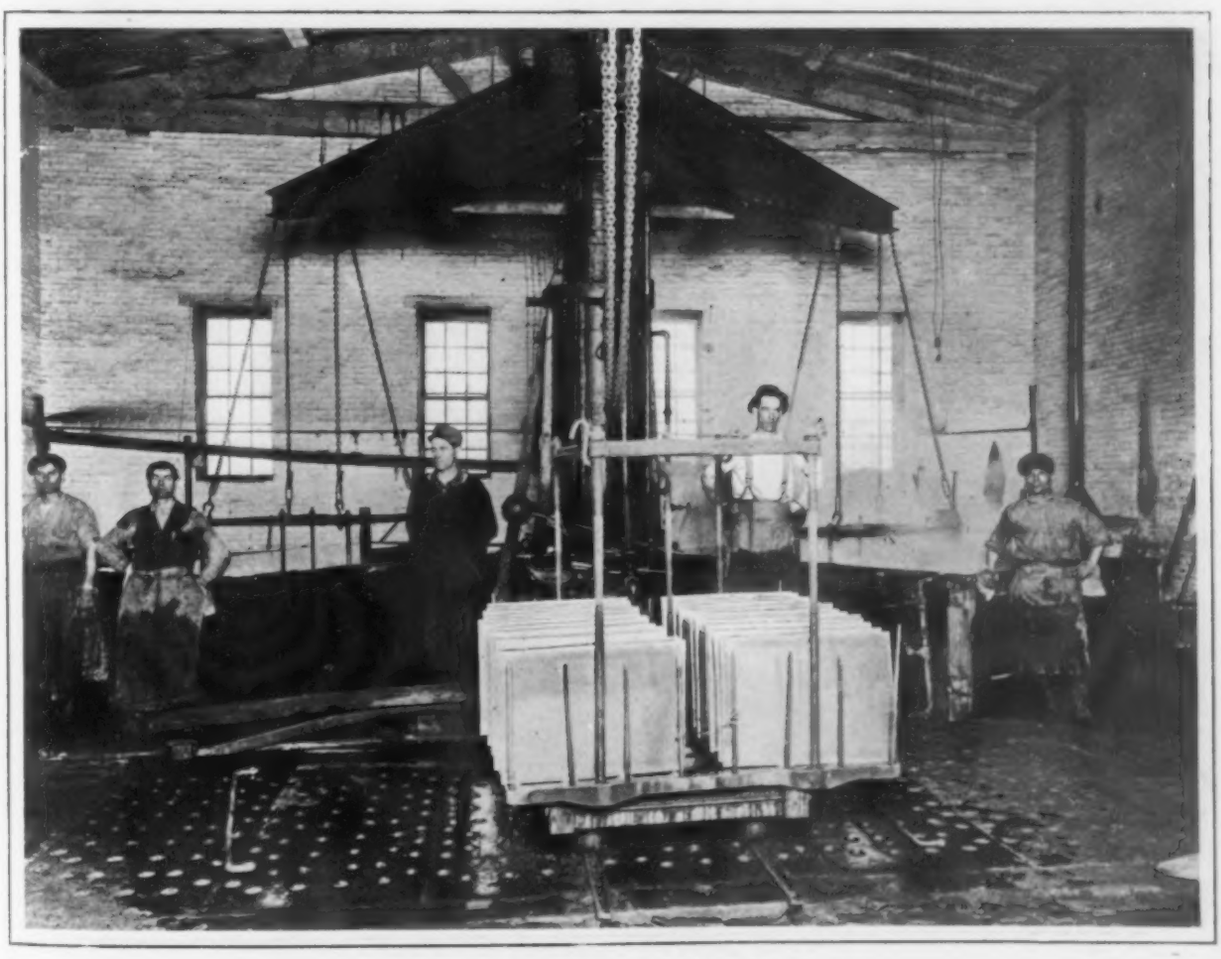


General Map of the Cumberland Works

Monorail Transveyor and Hoist Carrying Finished Blackplate to Tin House

The hoist is operated by a 4-hp. motor and has lifting speed of 13 to 26 ft. per minute. The travel is through a 2-hp. motor and has a speed of 250 to 300 ft. per minute. The runway is 17 ft. high and includes a 45-deg. curve.

The new tin-house recently completed at the works takes the place of the company's former finishing plant in Philadelphia. It embodies some new ideas gained from the company's long experience in the manufacture of high-grade tin plates, and is widely regarded as the last word in tin-house construction in this country. The building, including the pickling-room extension and tinning-stacks, is about 400 ft. long and 100 ft. wide. Of this width, the central portion of the building is served by a 5-ton Shaw standard 3-motor crane of 60-ft. span. The full load hoist speed of this crane is 25 ft. per minute; full load travel speed 300 ft. per minute. All motors are inclosed, and all gearing on the trolley is completely protected by cast-iron covers. The crane, interior walls of the building, and all structural steel work are painted white. The



Mesta Low Type Pickler in the Tin House

Tinning Stack for Making Common Terne Plates

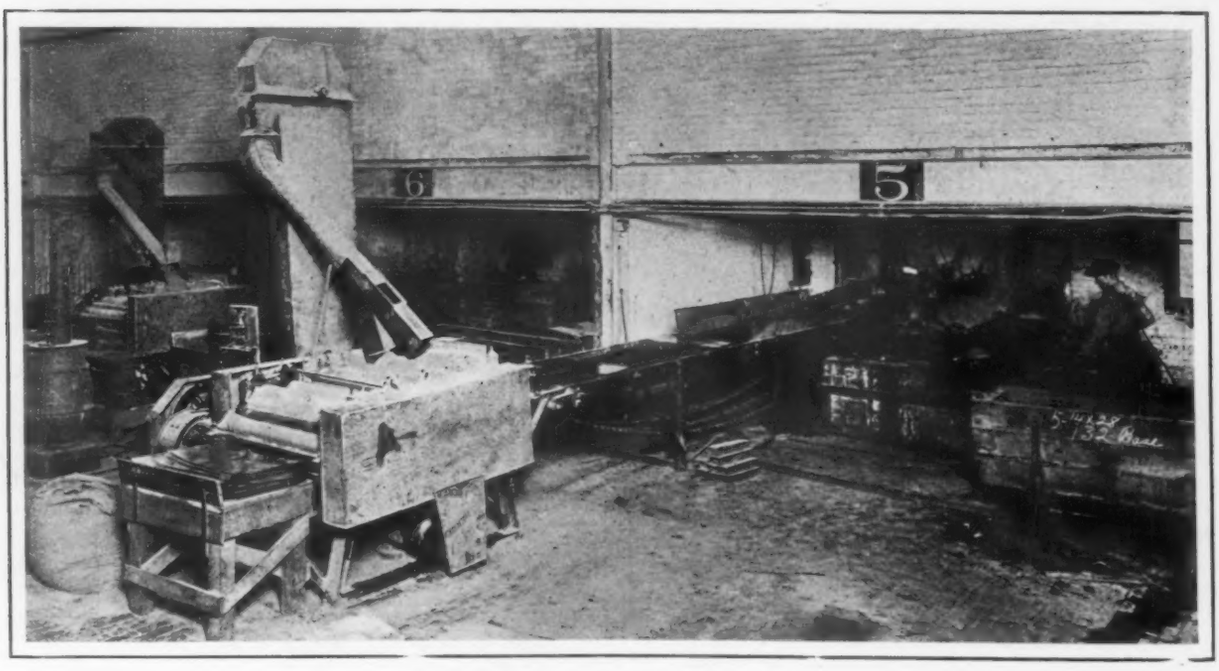
roof construction of the building has been especially designed to provide the maximum amount of light and ventilation. This is secured by providing alternate high and low bays, and the excellent lighting of the building is apparent from the accompanying illustrations. At night the building is lighted by large Adams-Bagnall regenerative flaming arc lamps and by Mazda tungsten incandescent lamps.

The stacks in which the tinning-machines are located are large and airy, being almost twice the size of the stacks in the company's old works at Philadelphia. They are built of structural steel covered with hollow tile to protect the steel members from the heat in case of fire in the stack. The stacks are lighted by large windows of fireproof construction, with wire glass, furnished by the Lyster Sheet Metal Works, Philadelphia, in accordance with the requirements of the National Board of Fire Underwriters for construction of this sort.

The tin-house is served by a pickling department equipped with an improved low-type 3-arm Mesta pickling machine. The equipment includes large tanks and cradles for pickling sheets up to 36 x 96 in. After pickling, the sheets are carried in waterboshes by the overhead crane directly to the various tinning-stacks. The tinning equipment and other machinery in the building are driven by Westinghouse 220-volt direct-current motors.

The product of the stacks is sorted on large tables occupying the center of the building. The finished sheets are carried by the crane to the extreme south end of the building, where they are stamped and packed. Space is also provided at this end for a stock of finished tin plate in boxes.

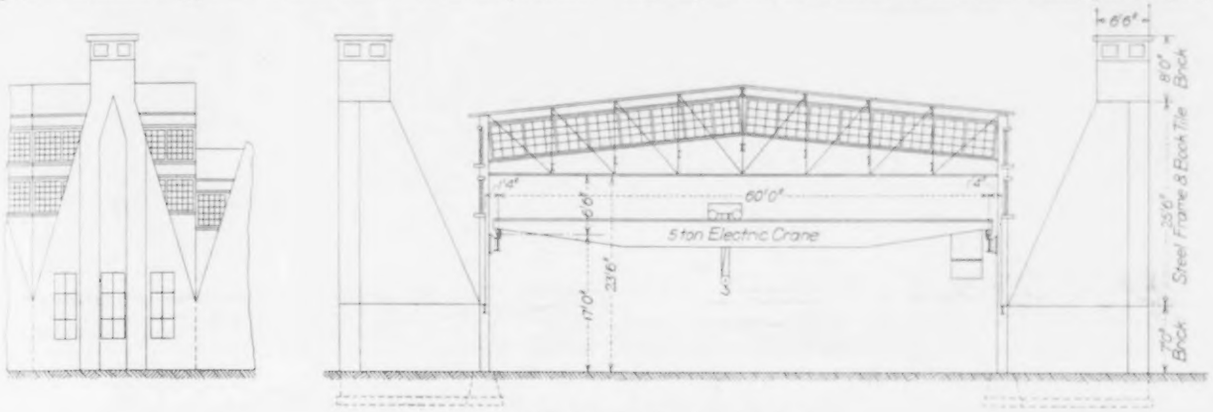
The tinning equipment includes combination charcoal stacks with Thomas & White tinning ma-



Tinning Machine for Making Coke Plates

chines and Morewood finishing pots, also Jumbo pots and machines for making heavy cokes and large tin and terne sheets up to 40 in. wide, any length. There are also triple machines, automatic catchers and patent cleaners for coke plates, built by the Aetna Foundry & Machine Company, and combination terne stacks equipped with Adams & White tinning machines, and finished through machines of the company's own design, making all grades of extra-coated plates from 12 lb. to 50 lb. The equipment includes also the "full 7-open-pot palm-oil-hand-dipping" stacks, an exclusive process of tin and terne drosses, the storage of black plate, the manufacture of copperas (ferrous sulphate) to utilize waste acid from the pickling processes, etc. A large and unusually well equipped machine-shop adjoins the tin-house building, with lathes, planing, shaping, milling, drilling and grinding machines, cold-saws, etc., for both light and heavy work.

An electric power house furnishes power and light for the entire works. This power-house is equipped with one Ames engine, direct-connected to 150-kw. General Electric generator; one McCuen engine, direct connected to 125-kw. Thompson-Ryan



Elevations Showing the Tinning Stacks

The Tin House from North End, Showing the Exceptionally Good Lighting. The Tinning-Stacks Are Located in the Recesses on Either Side. The Product of Each Stack Is Sorted on the Tables down the Center of the Building

employed by the N. & G. Taylor Company, in which are made the Target-and-Arrow brand of roofing plates, formerly called Taylor's Old Style. This process, it is emphasized, was transplanted bodily from the company's original works in Wales to their Philadelphia plant, continued there without change for 20 years, and removed complete to Cumberland.

All structural steel work of the building and stacks was furnished and erected by the Belmont Iron Works, Philadelphia. The tin-house building is roofed with Target-and-Arrow roofing tin.

The tin-house is served by other buildings providing for the storage of empty tin plate boxes, the refining and mixing of coating metals, the reducing generator, and one Ball engine belted to 62½-kw. Westinghouse generator. A new 300-kw. direct-connected unit is now being added to this equipment, consisting of a 24 x 24-in. piston-valve heavy-duty Harrisburg engine, connected to an 8-pole engine type 250-volt direct-current Crocker-Wheeler generator.

A laboratory is maintained for testing purposes, and a foundry for ingot molds and miscellaneous gray-iron castings, equipped with a Whiting cupola of 2500-lb. capacity, and a brass melting furnace, core ovens, etc.

Natural gas is used throughout the plant for all heating purposes, including the open-hearth fur-

Corner of the Works Laboratory

naces, heating and annealing furnaces, boilers, tinning-stacks, etc.

The various departments are connected by a private telephone system. Although a majority of the buildings of the plant are of fireproof construction the company has taken extensive precautions against the risk of fire, and hand-extinguishers and fire-pails, a 40-gal. chemical fire-engine and Newman time-detector watchman service is provided. The time of the employees is checked by the International time recording system.

In order to attract the best class of workmen to the plant, the comfort of the employees is provided for by a separate two-story building equipped with plumbing fixtures of the latest improved sanitary type, furnished by the John Douglas Company, Cincinnati. These include washstands with hot and cold water connections, shower baths, etc., shown in the accompanying cuts.

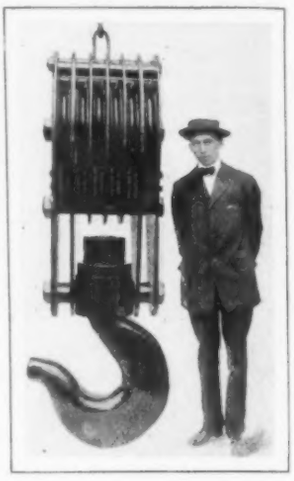
A BUSINESS 105 YEARS OLD

The development of this company's business has been an interesting one. Starting in 1810 in Philadelphia and continuing as an importing business until the McKinley protective tariff on tin plate went into effect in 1893, it moved equipment bodily from its Welsh connections to Philadelphia. The Philadelphia plant was operated for a number of years merely as a dipping-works, on black plate, some of which was imported and some furnished by American mills. Later, the Cumberland plant was purchased and practically entirely rebuilt. During the past ten years the product of the Cumberland works in the form of black plate was shipped to Philadelphia for tinning, but within the past year the tinning department has been moved to Cumberland, so that all processes are carried on there. The company's main offices continue in Philadelphia, at Chestnut and Third streets, and stocks of finished tin plate are carried in the principal cities of the country. The business of the concern has been handed down from father to son through four generations, being now in its 105th year.

Men's Lavatory, Toilets, Etc.

A Record Size Hook Block

What is believed to be the largest hook block ever made has been designed by the W. W. Patterson Company, Pittsburgh, Pa., for the Illinois Central Railroad. The total weight of the block is 2500 lb., and it will be used on a 50-ton derrick car for bridge erection work. The maximum load which the block will be called upon to handle is 50 tons, the factor of safety being 3½ to 1.



A Very Large Hook Block, Weighing 2500 lb., Built for Bridge Erection Work

The hook is equipped with ball bearings and was forged from a special billet 8 in. square. In the forging process the billet was flattened so that the final measurement was 10⅝ in. in depth and 6½ in. in width at the back. The hook and the beam, the latter supporting the hook in the block proper, weigh 1040 lb. A strap of ⅝-in. metal, 8 in. wide and a ½-in. and a ¾-in. plate are placed between the first and second sheaves of each side. The strap and the two plates support the beam of the hook and the three inside plates are ¼ in. thick. The block has four heavy cast-iron separators between each pair of plates, these being used to give more rigidity to the block than possible with the ones usually employed, which are made of gas pipe. The edges of the plates were ground and filed smooth, this being relied upon to eliminate any chance of the cable cutting on the edges of the plates.

The sheaves, which are 20 in. in diameter, are grooved for a ⅞-in. wire cable. Metaline bushings are used for the sheaves. The tail bolt is 2 in. in diameter and the sheave pin is 1 in. larger, a ½-in. dog being furnished for the latter to prevent it from turning. The diameter of the head bolt is the same as that of the sheave pin, 3 in., and the lugs of the beam supporting the hook are 3½ in. in. diameter.

Although the block was of special design and construction throughout, it was shipped in 23 days after the order was placed.

The General Electric Company reports the following among recent sales: Cambria Steel Company, Johnstown, Pa., 500-kw. rotary converters and six 175-kva. transformers and a 375-hp. induction motor and compensator; American Bridge Company, Pittsburgh, Pa., a 4-ton electric storage battery industrial locomotive; Aluminum Ore Company, East St. Louis, Ill., twelve 15-hp. induction motors and compensators; Forged Steel Wheel Company, Butler, Pa., eight 105-hp. mill type motors; Hartford Machine Screw Company, Hartford, Conn., four additional 75-hp. induction motors; Riter-Conley Mfg. Company, Pittsburgh, Pa., six centrifugal gas compressors; Bourne-Fuller Company, Cleveland, Ohio, a 200-kw. motor-generator set and switchboard; Southwark Foundry & Machine Company, Philadelphia, Pa., a 425-hp. induction motor and controller; Dobbie Foundry & Machine Company, Niagara Falls, N. Y., 13 induction motors ranging from 5 hp. to 50 hp., and three 2300-volt transformers and accessories; American Iron & Steel Mfg. Company, Lebanon, Pa., three mill motors of 200 hp., five of 300 hp. and one of 400 hp., provided with regulating sets for operation at variable speed.

Floor Conveyor for Handling Hot Shells

In *The Iron Age* of September 4, 1913, a description was given of the plant and manufacturing processes of the Prest-O-Lite Company, Indianapolis, Ind. Referring in that article to the process of annealing and the furnace equipment, the following statement was made: "Though not yet installed, the equipment for handling the annealed shells includes a conveyor on which the hot shells will drop from the annealing hearth, the conveyor to travel at such a rate as to bring the shells to the industrial track for transfer back to the presses, cool enough to be handled." The conveyor has now been installed, and the accompanying view shows the general character of the mechanism and the manner in which it does its work.

It is an endless type, the supporting chains on either side carrying cast-iron, perforated plate segments making a continuous moving platform flush with the floor. The conveyor is 6 ft. wide and 60 ft. long, so that, traveling at the rate of 12 ft. per min., the shells are given a cooling period of 5 min. in transit from the furnace to the distributing floor. The conveyor handles pieces weighing from 17 to 100 lb., although this is not the weight limit of the equipment. The number of pieces handled in a 10-hr. day varies from 500 to 3000, depending upon the sizes of the shells being treated, the length of time in the furnace varying with the size.

An Endless Conveyor with Perforated Plate Segments for Transferring Hot Metal Shells from the Annealing Furnace to the Presses for Further Working

This is equivalent to the handling of a daily aggregate of about 25 tons. To operate the conveyor from 5 to 7½ hp. is required.

Prior to the installation of the conveyor it was exceedingly difficult to hold men on the job of handling the shells from the furnaces because of the extreme heat, while the long rods with which the hot shells were manipulated made their distribution awkward and slow. This was especially true where, for economy of room in the furnace, tall shells of small diameter are placed in the larger diameter shells. Being much cooler, these are now separated much more easily while on the conveyor. Not only has the work been made easier for the men at the discharge end of the furnace, but the two men formerly required for dragging the shells to the cooling floor can now be eliminated. The conveyor was built by the Chain Belt Company, Milwaukee, Wis.

Ohio Metal

The Portsmouth Steel Company, Portsmouth, Ohio, has issued an illustrated brochure calling attention to its high-grade copper-bearing steel recently placed on the market and to which the name of Ohio Metal is being applied. The pamphlet states that this metal is an excellent example of the perfect blending of copper with open-hearth steel so as to clearly prolong its life and wearing abilities. While it represents the most practical and scientific amalgamation of the two metals, "its success is due no less to the fact that impurities, such as carbon, sulphur, silicon, manganese and phosphorus, have been reduced to a lower degree than is usual in basic open-hearth steel, and the remaining impurities, which could only be removed at very high cost, are evenly distributed throughout the metal by careful heat treatment, and the possibilities of corrosion and segregation avoided by the addition of the right amount of copper." The Portsmouth Steel Company has a staff of experienced and competent mechanics and metallurgists, backed by a plant in which every factor for efficiency and uniformity of results is maintained. This metal is offered by the company in several forms, such as billets (either for forging or rerolling), slabs, blue annealed sheets, box annealed sheets, galvanized sheets and sheared plates. It is also made up in various popular styles of roofing.

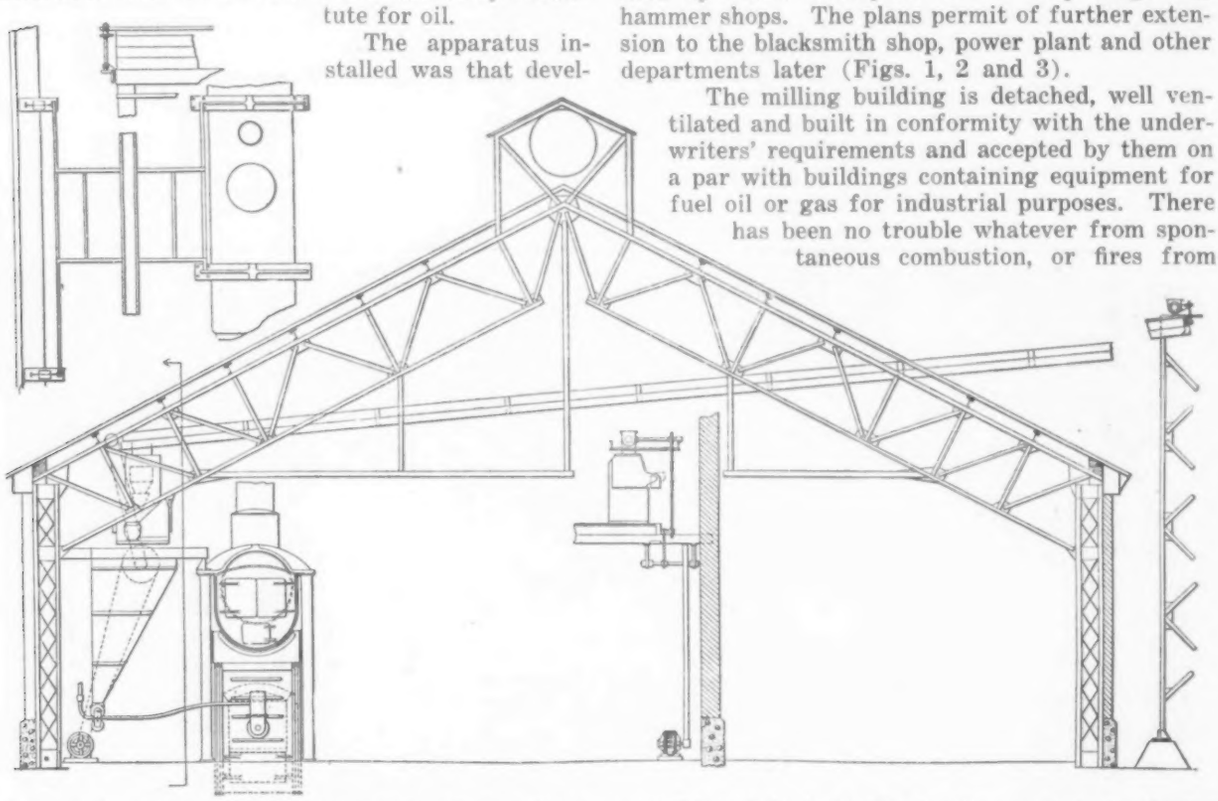
Powdered Coal in Industrial Furnaces*

Comparative Tests at Schenectady Works of the American Locomotive Company, with Oil, Mine Run Coal and Pulverized Coal

BY WILLIAM DALTON AND W. S. QUIGLEY

At the works of the American Locomotive Company, Schenectady, N. Y., oil furnaces have been in use for heating the blanks for drop forgings and general small forge work and hand-fired coal furnaces for the heavier work in the hammer shop. The equipment is now being changed to burn powdered coal fuel, and a milling building has been erected to contain the coal drying and pulverizing apparatus. The advance in the price of fuel oil in 1912 and the refusal of the oil companies to guarantee deliveries or to renew contracts for any considerable length of time led to an investigation to determine what fuel would be a satisfactory substitute for oil.

The apparatus installed was that developed by the American Iron & Steel Mfg. Company at its Lebanon and Reading works and now handled by the Quigley Furnace & Foundry Company, New York. The plant was built and started in May, 1913, and while there has been the usual amount of trouble in getting a new fuel system to run smoothly, the results have been satisfactory.



Cross-section of the Hammer Shop, American Locomotive Company, Schenectady, N. Y., Showing Conveyor Bringing the Pulverized Fuel to the Scale and Thence to the Hopper and the Three-Door Hammer Furnace. In the center is an elevation of the drive and at the upper left a part plan of furnace

The coal milling and distributing plant is motor-driven and centrally located in a building of non-combustible construction. At present it has a capacity of 5 tons an hour and is so arranged that by duplicating the dryer and pulverizer its capacity can be doubled. This plant has a concrete hopper placed under an elevated track where it can be served either by discharging directly into it from the car or from the stock pile by means of a traveling crane and grab bucket. The concrete car hopper discharges into a rotary crusher capable of reducing 20 tons per hour of run-of-mine coal to ¾-in. cubes, from which it is carried by means of a bucket elevator to a storage bin which discharges by means of chutes and reciprocating feeder into an indirect-heat type dryer of 6-tons per hour capacity. From here it is elevated to a dried coal storage bin arranged to feed by chutes directly into the pulverizer, then elevated to a pulverized coal storage bin, from which it is distributed by screw conveyors to the drop forge and hammer shops. The plans permit of further extension to the blacksmith shop, power plant and other departments later (Figs. 1, 2 and 3).

The milling building is detached, well ventilated and built in conformity with the underwriters' requirements and accepted by them on a par with buildings containing equipment for fuel oil or gas for industrial purposes. There has been no trouble whatever from spontaneous combustion, or fires from other causes, and there appears to be no reason to expect trouble from this source if ordinary precaution is used, as required with any other kind of fuel.

To insure the best results, the coal should be of high volatile and low ash and should be dried so as to contain not over ½ of 1 per cent. of moisture, care being taken in drying to avoid overheating and so driving off any of the volatile content. The coal should be pulverized to a fineness that will permit 93 to 95 per cent. to pass through a 100-mesh sieve, and for some classes of work even a greater degree of fineness has been found desirable.

In the burning of powdered coal, the fuel controlling device is the most essential element in the successful operation of the system as a uniform and controllable supply of the powdered coal must be supplied to the burner at all times. The controller used in this installation was developed by the

*From a paper presented to the American Society of Mechanical Engineers, St. Paul, June 17. Mr. Dalton is chief engineer of the American Locomotive Company and Mr. Quigley is vice-president of the Quigley Furnace & Foundry Company.

American Iron & Steel Mfg. Company, and used successfully by that company for seven years.

The furnaces in the drop shop are rebuilt oil furnaces and those in the hammer shop are rebuilt hand-fired coal furnaces, and it should be emphatically stated that it is a serious mistake to attempt to apply powdered coal to existing furnaces without rebuilding them in a manner best suited to that fuel, since rapid and economical operation, as well as the elimination of the ash, cannot be accomplished without properly designing the furnaces for the new fuel. Coal has been burned in this plant with an ash content as high as 18 per cent. with uniformly good results, although the high ash causes considerable annoyance where open furnaces, such as used for heating small forgings, rods, etc., without doors are used or where doors are not wholly closed during operation, unless efficient hoods or an exhaust system for properly disposing of the small particles of escaping ash is installed.

The foregoing gives in a general way a description of the important features of the plant. After the first two furnaces were equipped in the drop shop and one in the hammer shop, tests were made to determine the savings effected with the use of powdered fuel as compared with fuel oil and hand-fired coal practice; and also as to what changes needed to be carried out in the alterations upon the other furnaces. The results of the tests are here given:

Comparison of Pulverized Coal Furnace and Oil Furnace (Both Same Size) in Drop Shop

	Pulverized Coal Furnace No. 3335	Fuel Oil Furnace No. 5078
Hours run	10 hr. 22 min.	9 hr. 25 min.
Fuel consumed	2177 lb. coal	138 gal. oil
Average time per heat	25.1 min.	25.8 min.
Average time per forging	1.87 min.	1.47 min.
Actual forgings	122	132
Forgings to be counted	132	132
Cost of fuel at contract price	$2 82 ($2.56 ton)	$6.69 (4.8c. gal.)
Cost of fuel delivered to the furnace	$3.31	$6.89

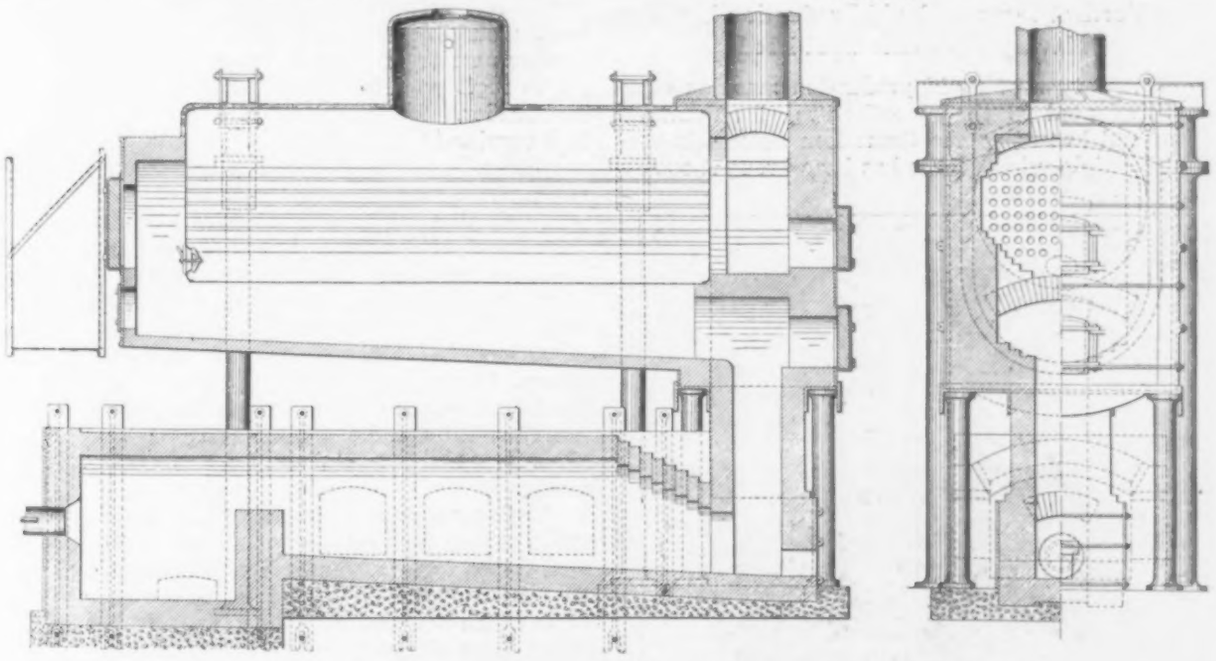
The powdered coal furnace ran 57 min. longer than the oil furnace. However, 30 min. were lost because of failure to charge furnace on the one day and 18 min. were lost on the next because plate for heating dies was not put in at the proper time.

The work was on pedestal die wedges, which are of iron. The blocks weigh 25 lb. and the forgings 16 lb. The time lost on the pulverized coal furnace would more than allow for making the 12 forgings, so that the amount turned out by each furnace should be considered equal as indicated in the table above.

Some weight should be given the fact that the oil costs were probably kept at a minimum, as the heater was thoroughly familiar with oil and was able to obtain the maximum heat with the minimum amount of fuel oil. The same men ran each furnace and the only factor of importance was that the ram used on the hammer at the oil furnace was about 500 lb. heavier than the ram on the hammer at the coal furnace. This did not affect the time of heats, but allowed a quicker forging time and there was less time lost with nothing in the furnace.

The coal contained over 14 per cent. of ash, which is too high for the efficient use of pulverized coal. The volatile matter analyzed low (20-28 per cent.), but as this coal has been running above 30 per cent. in volatile matter it is believed there must have been some fault in the analysis in this respect and investigations are now being made regarding it.

The results show the cost of operating the furnace on pulverized coal in these tests was 48 per cent. of operating it on fuel oil at the present price.



The Three-Door Furnace with Waste Heat Boiler Equipped for Burning Pulverized Coal

Comparison of Tests on Large 3-Door Forge Furnaces of Same Size Under Waste Heat Boilers Nos. 45 and 61

No. 45, old style furnace burning mine run coal, hand-fired. Nov. 12, 1913.
No. 61, new furnace equipped to burn pulverized slack coal. Nov. 21, 1913.

	Boiler No. 45 Mine Run Coal	Boiler No. 61 Pulverized Coal
Hours ran	10 hr. 5 min.	9 hr. 30 min.
Fuel consumed	4630 lb.	3200 lb.
Average time per heat	117 min.	120 min.
Cost of fuel actually delivered	$6.69	$4.14
Tonnage per furnace	9920	9920
Cost of milling, conveying and blast	$0.48	$1.04
Total cost of fuel burned	$7.17	$5.18
Cost per ton output	$1 45	$1.05
Stack temperature	340 deg. F.	240 deg. F.
Blast on furnace	9½ oz.	1 oz.
Blast on coal	....	6 oz.

Another table covers a comparison of two furnaces on the same class of work and heating the same amount of material. There was too high a percentage of ash in the slack coal (13.72 per cent.), otherwise the samples are representative

of the two grades of coal used. In comparing the maintenance of the two styles of furnaces, the pulverized coal furnace had not been run long enough to make an accurate comparison, but indications are that the maintenance of the pulverized coal will not exceed that on the old style and will probably run less. The saving in labor with the pulverized coal furnace is shown to be:

Three men on ashes at $1.75	$5.25
Three men on fires nights at $2.10	6.30
Per 24 hours run	$11.55

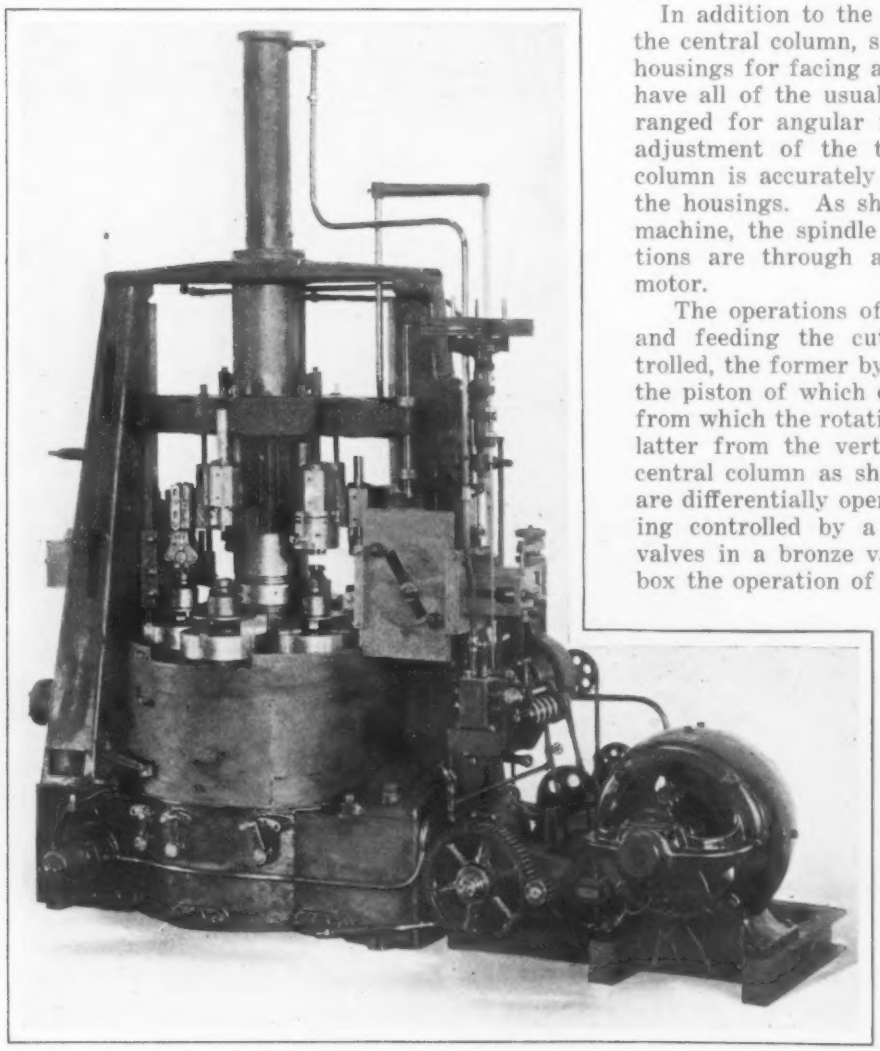
Based on the shop running at average capacity there would be a labor saving of $11.55. This allows for men to start furnaces in the morning and wheel away ashes and slag.

From these reports it will be noted that the air pressure required for burning powdered coal is materially less than that used on either oil or hand-fired coal furnaces. Owing to this decrease it was found necessary to lengthen the stack on the waste heat boiler to increase the draft and afford a better circulation.

A MULTIPLE-SPINDLE LATHE

New Vertical Type of Rapid Production Machine Having Hydraulic Tool Feed

A new type of rapid production machine especially adapted to the manufacture of automobile parts and known as the Conradson automatic vertical multiple-spindle lathe has been brought out by the Giddings & Lewis Mfg. Company, Fond-du-Lac, Wis. This machine possesses all the functions of a multiple-spindle turret lathe with the added advantages of a hydraulic control tool feed and a design which economizes floor space and promotes easy handling of the work, together with exceptional rigidity.

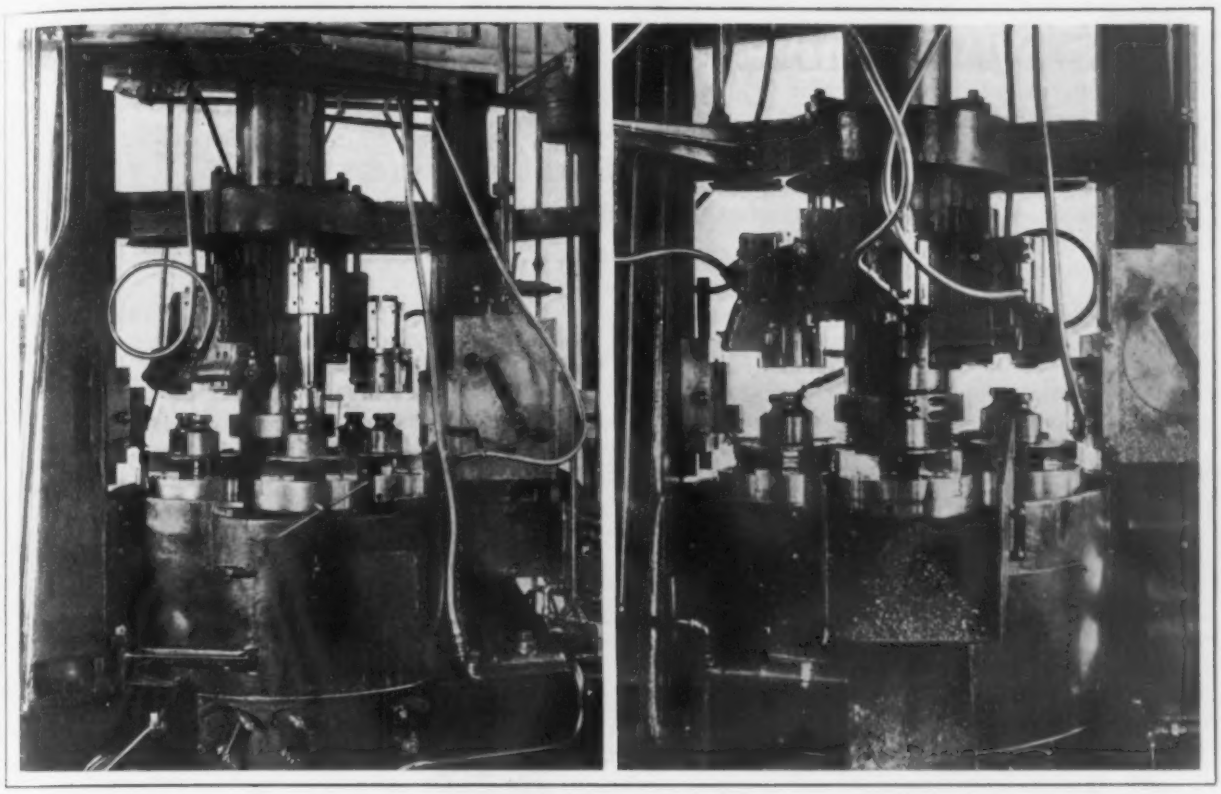


A Recently Developed Vertical Automatic Multiple-Spindle Lathe for the Rapid Production of Automobile Parts

The design provides for a heavy base which carries a central column and side housings with a cross girt at the top to support this column in rigid alignment. Mounted on this central column is a spindle carrier with six spindles. The carrier is arranged with a circular rack and pinion, by means of which drive the six spindles are rotated into successive positions about the central column. At each spindle position the spindle gears roll in and out of the mesh with driving gears arranged to provide all of the necessary speed changes required by the size of the work. During the indexing operation the spindle speed is greatly reduced and the mechanism is arranged so that the tool is brought up to full speed simultaneously with the downward feed of the tool carrier. The indexing operation is completed very rapidly, the time being approximately 2½ sec. The spindles are fitted with chucks in which the work is mounted. Immediately above the spindle carrier is a hexagonal tool carrier, likewise mounted on the central platform. As the former carrier is rotated the spindle positions are set to register with the position of the tools in the tool holder. These tool posts are mounted in the tool carrier in such a way as to give independent vertical adjustment for presenting the tool to the work.

In addition to the cutting tools mounted around the central column, side heads are provided on the housings for facing and turning. These side heads have all of the usual adjustments and may be arranged for angular feed if desired. The vertical adjustment of the tool carrier upon the central column is accurately guided by means of ways on the housings. As shown in the illustration of the machine, the spindle drives for the cutting operations are through a gear train from a driving motor.

The operations of revolving the spindle carrier and feeding the cutting tools are entirely controlled, the former by means of a rotating cylinder, the piston of which engages with a ratchet pinion from which the rotating rack gear is driven and the latter from the vertical cylinder mounted on the central column as shown in the illustration. Both are differentially operated cylinders, the pistons being controlled by a timer actuating a series of valves in a bronze valve box. Through this valve box the operation of the circular rack which determines the spindle positions is co-ordinated with the adjustment of the tool carrier through the main cylinder. The feed of the tools is effected by a variable stroke multi-cylinder pump and the rate of feed can be changed without stopping the machine and is, in fact, automatically changeable at any point. This affords very desirable flexibility in adopting the tool to the contour of the work. Samples of rough turned work done on this machine are interesting as showing the regularity of the feed under this control.



Front and Rear Views of the Machine Showing the Chucking Position of the Neutral Spindle with Hub Pieces Set Up for Finishing and the Facilities for Discharging the Metal Cuttings

A view is shown of this turret lathe tooled for the finishing of automobile hubs as well as a view of the lathe from the rear of the machine, showing the manner of disposing of the metal cuttings. These hubs are of malleable iron and can be finished at the rate of 25 per hr.

The machine having been once set up for any piece of work, the operator is required only to chuck the rough parts and remove the finished pieces, standing in front of the machine at the chucking position, the spindle at this station being neutral. The rate of feeding can be changed with the machine running and two rates of feed are provided. The spindle speed may be changed at any part of the cut and the feed as well. The machine may also be operated with independent feeds for any or all of the tool posts. For very rapid work of more simple character the machine can be arranged for double indexing, that is, equipped with two sets of chuck jaws and two sets of tools, being arranged to automatically skip one station every time it indexes. Thus three pieces may be finished on both sides at every rotation of the spindle carrier.

This machine is now being made in two sizes, style B, equipped with 13½-in. chucks and style D, with 24-in. chucks. The latter size is guaranteed to finish an automobile flywheel 17 in. in diameter completely in less than 6 min. and a 12½-in. differential gear forging in 3 min. In the choice of materials of construction special care has been taken in the use of hardened and ground steel for spindles and gears, phosphor-bronze boxes for bearings, and alloy steels to resist wear and breaking stresses, to all of which has been added a liberal factor of safety in determining the size of the working parts.

The coal milling building of the Midvale Steel Company, illustrated on page 1565 of *The Iron Age* of June 25, is steel sheathed, as stated in the article, but it appears that this sheathing, which covers both the roof and sides of the building, is of asbestos protected metal.

Pulverized Coal for Steam Making

In a paper presented at the recent spring meeting of the American Society of Mechanical Engineers, F. R. Low, editor of Power, describes some of the earlier attempts made to use pulverized coal under boilers. He also mentioned some of the systems on which effort is being expended at the present time. It is pointed out that with the ordinary method of burning coal, the grate with its solid bed of incandescent fuel is more or less encumbered with ash and clinker, it offers a considerable resistance to the passage of air and allows some of the unburned fuel to sift to the ashpit or to be fused with the clinker. If the fuel can be burned in suspension, many of these difficulties disappear and the draft-producing apparatus is reduced to that which will remove the products of combustion and allow enough air to enter to burn the required amount of fuel. The possibility of getting an adequate supply of oxygen to the finely comminuted carbon allows perfect and smokeless combustion with a minimum air supply, but the result is a high temperature with erosive and reducing characteristics that are not favorable to a long furnace life. If this is reduced by decreasing the amount of fuel fed the capacity is limited, while if an effort is made to secure the same result by increasing the air supply the efficiency is sacrificed.

Explosions of prepared fuel outside the furnace can be easily guarded against, as the coal, no matter how finely it may be divided, does not contain the elements necessary for its own combustion and will burn only slowly if kept in a compact mass. It is only when it is diffused in a cloud that the atmospheric oxygen can get to it quickly enough to make the rate of combustion dangerous. Pulverized fuel can be conveyed in practically any type of holder if care is taken that it is not blown or sifted about in a finely divided space. Precautions must be taken in designing chutes, conveyors, etc., that the pitch is set to provide against the flowing of their contents.

In conclusion the author states that the cost of pulverizing and the large initial cost of the apparatus required have combined to restrict the use of pulverized coal for boiler purposes to special instances.

The Board of Trade of Massillon, Ohio, has started a movement to raise a fund of $50,000 to be used in purchasing building sites and securing new industries for that city.

A New Vibratory Testing Machine*

A Device That Furnishes Dynamic Values of Iron and Steel Under Stress —Some Results Obtained by Its Use

BY S. V. HUNNINGS†

For a number of years several of the large railroad systems have included a vibratory test requirement in their specification for staybolt iron; other large consumers, while not actually purchasing iron under such a requirement, have given the property to resist vibratory strains marked consideration in placing their contracts. The great drawback against the inclusion of a vibratory test requirement in such specifications has been due to the radical variation frequently shown in the results of such tests, when made on specimens cut from the same bar, and apparently tested under identical conditions; and also the fact that no two vibratory machines, either built by makers of testing machines or by companies for their private use, were designed with the essential features sufficiently standard to permit of the adoption of a standard method of making a test that could be accurately adhered to for comparison with tests made on machines of different designs. These are the conditions which have confronted sub-committee III. on staybolt and engine-bolt iron, of committee A-2, in its effort to standardize this test.

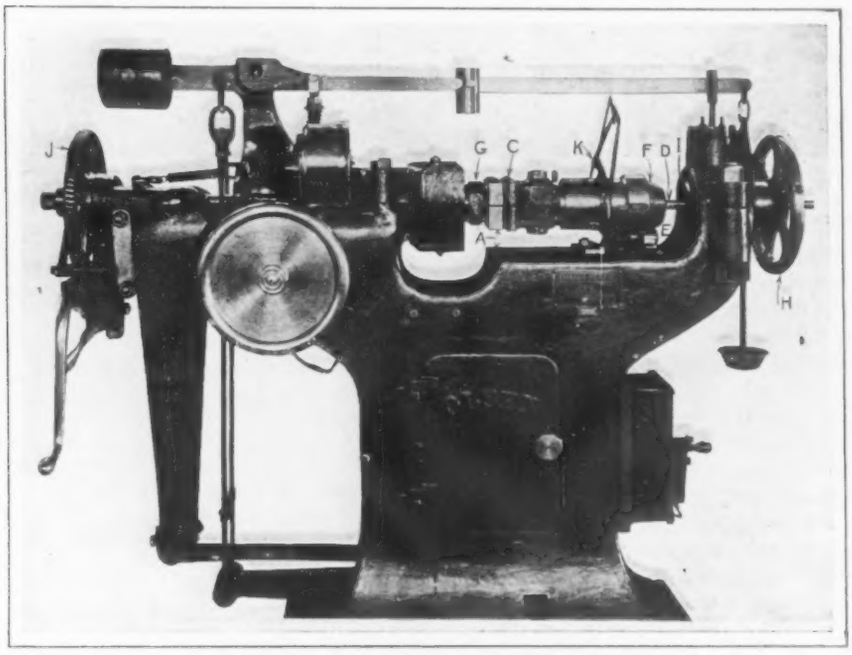


Fig. 1—New Vibratory Testing Machine

A study of the machines and methods of testing by the above sub-committee indicated that the erratic results frequently obtained from specimens cut from the same bar and tested on the same machine, were due to the fact that the specimens, although apparently perfectly rigid in all cases, were held with different degrees of rigidity; furthermore, the root of the thread of bolts differed to such an extent in sharpness and smoothness as to exert a pronounced influence upon the number of vibrations the specimen would withstand.

It was with a view of securing a machine that would overcome these defects, and which would also permit making such tests rapidly with a high degree of accuracy, that C. L. Heisler, a designing engineer of the American Locomotive Company, developed a machine along lines suggested by the author's investigations conducted as chairman of the sub-committee referred to above. It is gratifying to be able to state that experience has shown the machine to possess the following advantages:

It is built especially strong; the heaviest size staybolt iron, as well as large specimens of heat-treated alloy steels, can be tested as accurately as the smaller sizes of staybolt iron; the fixed end of the specimen is held absolutely rigid—the three-piece jaws and exposed position of the test specimen gives an operator or inspector ready means of satisfying himself of this fact; the accuracy of the tensile stress and deflection can be readily proven; the test specimen can be as easily placed and adjusted in the machine, and removed when broken, as a threaded tension specimen can be adjusted or removed from a tension testing machine; oscillating and rotative vibratory tests, as well as tension tests, can be made on the machine, making it possible to subject round specimens to either an oscillating or rotative vibratory motion; furthermore, rectangular specimens, such as spring steel, can be subjected to the oscillating motion. To the author's knowledge, no other machine possesses such a wide range of capacity.

Fig. 1 shows the machine adjusted for making a test by the rotative vibratory motion; to make a test by the oscillating motion it is only necessary to clamp a guide yoke at *A* and to adjust the bolt *C*.

Attention is called to the following features of the machine: The bed or frame is made so heavy that a specimen of steel 1¼ in. in diameter and having an elastic limit of 125,000 lb. per sq. in., can be tested without causing the frame of the machine to weave a perceptible amount. The specimen may, if desired, be tested under a direct tensile stress of 40,000 lb., and the load accurately maintained throughout the test. The weighing mechanism is as accurately designed as that of any tension testing

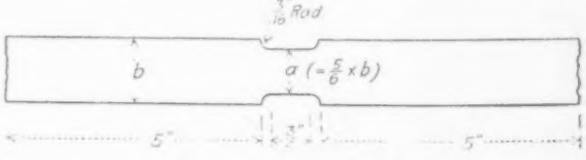


Fig. 2—Vibratory Test Specimen

*From a paper presented at the seventeenth annual meeting of the American Society for Testing Materials, Atlantic City, June 30 to July 3.

†Chemist and engineer of tests, American Locomotive Company, Schenectady, N. Y.

machine; in fact, tension specimens of 2-in. gage length can be tested in this machine as accurately as in a tension testing machine.

The deflection is measured by a duplex multiplying caliper, one pair measuring the horizontal movement and the other pair the vertical movement. The measurement can be taken at any point from 6 to 12 in. from the fixed end of the specimen. Measuring the deflection in this manner insures against any inaccuracy, such as lost motion, due to wear in the thread of the jaws. The possibility, however, of errors occurring because of a very minute movement of the bolt at either end, the influence of which made the result of the test questionable, suggested the desirability of making the test on a more simple specimen—that is, a specimen that could be easily and quickly machined and be held more rigid than a threaded specimen, and, finally, a specimen having a form easily standardized, thereby insuring all tests being made under identical conditions. This has

Table of Vibratory Tests Made on New Vibratory Testing Machine.

Serial No.	Description	Vibrations (rotating)			Tension tests				Chemical composition, per cent			
		A	*B*	*C*	Tensile strength, lb. per sq. in.	Yield point, lb. per sq. in.	Elongation in 2 in., per cent	Reduction of area, per cent	C.	Mn.	P.	S.
	Staybolt iron											
1	Brand A	10,930	9,350	12,620	48,260	33,810	28.12	45.3	....	....	....	....
2	Brand A	11,800	9,440	9,450	48,620	33,780	32.50	50.2	....	....	....	....
3	Brand B	8,050	7,720	8,830	49,930	35,160	30.87	50.8	....	....	....	....
					49,910a	34,400	33.00	50.8	....	....	....	....
4	Brand B	10,610	13,680	10,070	49,830	34,220	31.25	48.6	....	....	....	....
					48,090a	33,750	31.12	54.0	....	....	....	....
5	Brand C	9,760	7,990	8,410	50,680	36,980	30.25	48.6	....	....	....	....
					50,430a	36,140	30.87	53.0	....	....	....	....
6	Brand C	8,940	8,510	9,480	50,830	37,820	30.00	51.1	....	....	....	....
					50,670a	37,760	29.62	52.1	....	....	....	....
	Bar steel											
114	Bar A, untreated	7,190	6,310	7,460	48,660	35,620	45.0	72.8	0.09	0.26	−0.03	0.024
115	Bar B, untreated	7,110	6,490	8,090	50,590	35,820	43.0	76.6	0.09	0.31	−0.03	0.025
117	Bar C, untreated	4,660	4,570	4,670	61,690	38,380	36.5	64.6	0.125	0.59	−0.03	0.070
118	Bar D, untreated	5,860	5,490	5,300	63,570	38,610	35.5	64.6	0.13	0.57	0.063	0.080
120	Bar E, untreated	7,290	7,640	6,390	73,680	43,410	31.5	53.3	0.38	0.55	−0.03	0.063
120	Bar E, annealed 1450 deg. F	4,000	4,140	....	70,960	42,600	32.5	56.0	0.38	0.55	−0.03	0.063
120	Bar E, quenched and tempered	7,780	7,760	....	81,280	52,180	30.5	62.1	0.38	0.55	−0.03	0.063
121	Bar F, untreated	8,780	10,800	....	76,590	42,170	31.0	57.9	0.20	1.05	0.044	0.089
121	Bar F, annealed 1450 deg. F	6,900	....	....	75,400	41,080	31.0	48.4	0.20	1.05	0.044	0.089
121	Bar F, quenched and tempered	7,410	7,900	....	82,620	60,840	31.0	62.1	0.20	1.05	0.044	0.089
	Cast steel											
7	Carbon open-hearth steel (acid)	11,640	9,190	....	77,940	44,910	30.5	48.4	....	....	....	....
8	Carbon open-hearth steel (acid)	10,730	11,230	....	77,940	44,910	30.5	48.4	....	....	....	....
9	Carbon open-hearth steel (acid)	11,850	11,310	....	77,940	44,910	30.5	48.4	....	....	....	....
10	Carbon open-hearth steel (acid)	11,350	11,840	....	77,940	44,910	30.5	48.4	....	....	....	....
11	Carbon open-hearth steel (acid)	8,780	11,410	....	69,200	40,260	33.0	53.5	....	....	....	....
12	Carbon open-hearth steel (acid)	10,450	8,820	....	69,200	40,260	33.0	53.5	....	....	....	....
13	Carbon open-hearth steel (acid)	11,340	11,750	....	69,200	40,260	33.0	53.5	....	....	....	....
14	Vanadium open-hearth steel (acid)	19,200	....	....	80,940	48,060	26.0	47.8	....	....	....	....
15	Vanadium open-hearth steel (acid)	15,670	....	....	80,540	49,000	25.5	48.9	....	....	....	....
	Steel forgings											
A-1	Chrome-vanadium, cross-head key, quenched and tempered	48,940	....	....	127,550	116,900	20.5	50.1	0.31	0.49	−0.03	0.03*
A-2	Chrome-vanadium, cross-head key, quenched and tempered	62,140	....	....	105,950	88,960	17.5	39.5	0.31	0.49	−0.03	0.029†
107	Carbon, B, untreated	8,820	7,000	....	87,670	53,070	21.0	27.0	0.56	0.33	−0.03	0.044
108	Carbon, B, annealed 1450 deg. F	6,640	6,460	....	79,900	40,360	25.0	35.2	0.56	0.33	−0.03	0.044
109 *A*	Carbon, B, quenched 1550 deg. F., drawn 1025 deg. F	21,800	20,120	{14,400 {20,320	114,800	72,200	17.0	37.1	0.56	0.33	−0.03	0.044
109 *B*	Carbon, B, requenched 1575 deg. F., drawn 1300 deg. F	11,600	11,010	....	95,620	62,840	23.0	46.0	0.56	0.33	−0.03	0.044
110	Carbon, C, untreated	6,020	....	....	75,150	45,900	30.0	46.2	0.45	0.39	−0.03	0.039
110	Carbon, C, untreated	7,380	....	....	77,270	46,400	29.0	47.7	0.45	0.39	−0.03	0.039
111	Carbon, C, annealed 1450 deg. F	5,070	5,160	4,770	68,620	36,830	30.5	49.3	0.45	0.39	−0.03	0.039
112 *A*	Carbon, C, quenched 1550 deg. F., drawn 1025 deg. F	11,360	12,060	....	91,150	56,180	22.0	34.4	0.45	0.39	−0.03	0.039
112 *B*	Carbon, C, requenched 1575 deg F., drawn 1300 deg. F	6,970	7,390	....	80,200	50,430	27.0	45.3	0.45	0.39	−0.03	0.039

NOTE.—All tension test specimens are those adjoining vibratory test specimen *A*, except those marked (a) which adjoin vibratory test specimen *C*.
*Chromium 0.96; vanadium 0.16 per cent.
†Chromium 1.01; vanadium 0.17 per cent.

eccentric bearing, which controls the amount of deflection or eccentricity.

To insert a specimen *D* in the machine, the dogs *E* are thrown up to engage the slots in the specimen chuck *F;* the chuck is then tightened by turning the nut *G*, the plunger wheel *H* is then adjusted and thereby tightens the chuck jaws *I*, which rigidly hold the fixed end of the specimen; by adjusting the wheel *J*, tension is applied to the specimen, and the machine may be started after taking the reading of the revolution counter *O*.

The jaws are chambered and fitted with circular leaf springs which throw them open when the specimen chucks *I* and *F* are released. The jaws first used on the machine were threaded in accordance with staybolt practice—that is, with 12 V-threads per in. These jaws gave satisfaction and held the specimen perfectly rigid when the lead of the thread of the bolt was precisely the same as that of the been repeatedly proved impossible when working on threaded specimens, as the bolts differed at the root both in sharpness and smoothness of the cut.

After considerable experimenting, it was found that the specimen shown in Fig. 2 was the most desirable from almost every standpoint, and that such a specimen could be held perfectly rigid on this machine with ordinary knurled jaws. This type of specimen and jaw was used in making the tests referred to in this paper. The specimen is well adapted for routine work, and is especially desirable for vibratory testing of staybolt iron where it is important that the diameter of the test section should closely approximate the diameter of the staybolt at the root of the thread. It is for this reason that the diameter of the test section is made equivalent to five-sixths of the nominal diameter of the specimen tested.

For testing material not influenced by the

amount of metal removed, and especially adapted for delicate work, experiments are being conducted with a different type of jaw. The results obtained to date are very encouraging.

The test specimen shown in Fig. 2 has the following advantages:

1. It can be prepared very quickly by roughing out with an ordinary lathe tool, finishing to size with a tool ground to a templet, then polishing with oil and emery paper. For closer work the specimen can be roughed out, then ground to size. When testing staybolt iron, or other bars that are rolled close in size and truly circular, it is only necessary to center the specimen accurately and then machine the test section.

2. It is of a form that can be easily ground or polished and will permit the ready use of a gauge to check the diameter and radius of the fillet.

3. The length of the test specimen insures the concentration of the fiber stress at the forward end of the specimen, providing, of course, that the specimen is accurately machined.

4. A turned test specimen permits the study of the material during the progress of the test. This is especially interesting and gives valuable information.

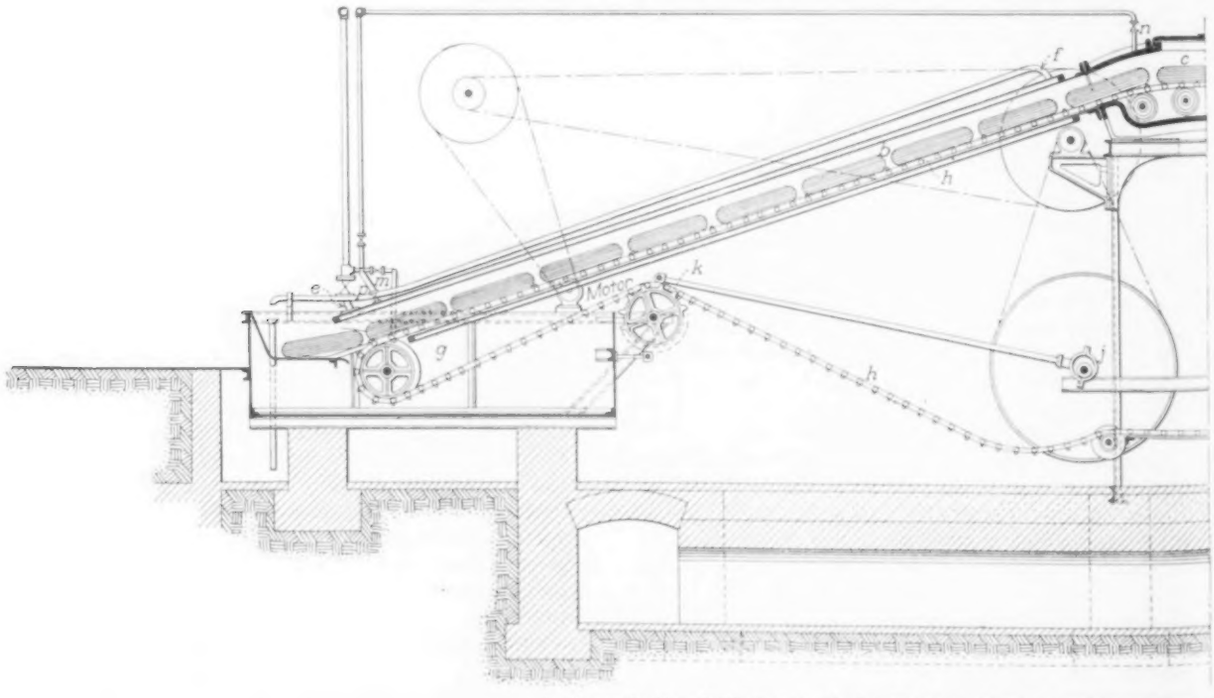
The tests shown in the table were made with a tensile stress of 5500 lb. per sq. in. and the specimen rotated under a deflection of 1/16 in. as measured at a point 6 in. from the fixed end. When it was possible to do so, two vibratory tests were made from each bar or specimen; with but few exceptions the variation in results from the same bar have checked each other closely, as seen by reference to the table.

Improved Continuous Annealing Furnace

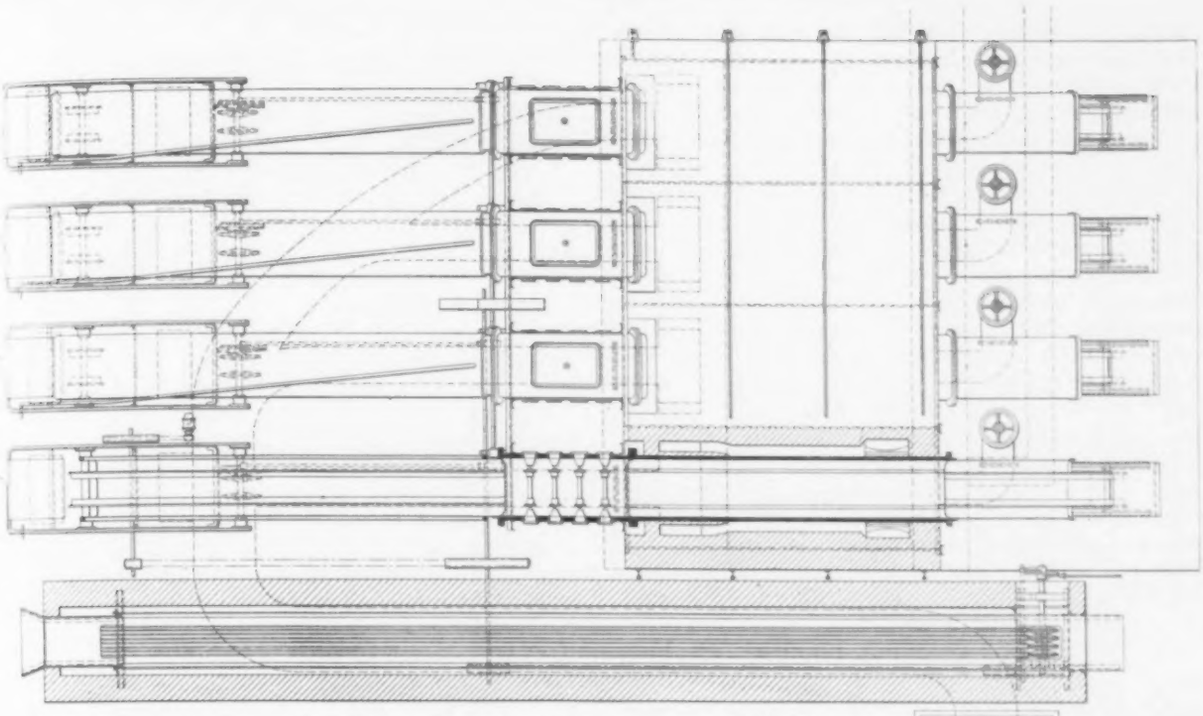
A German Invention for the Heat Treatment of Steel Wire, Bands and Similar Material—Quadruple Unit Construction

Salau & Birkholz, Essen an der Ruhr, Germany, are building a new type of continuous annealing furnace, under patents granted to J. Walther, works manager of the Gutehoffnungshütte, Gelsenkirchen. In addition to being continuous in operation the furnace, as will be noticed from the plan view, consists of four units, arranged side by side. It is designed to be used principally with steel wire and bands, which become so hard by reason of the decrease in thickness, following the hot rolling, that they must be annealed to enable them to be worked cold. This results in the formation of a deposit on the metallic surface, which must be removed by corroding or washing with acid, this treatment being not only cumbersome and expensive, but also deteriorating the quality of the product. With this new furnace, it is pointed out that metallic articles, such as iron, steel, nickel and the like, can be clean annealed, thus eliminating the production of ferrous oxide during the annealing process and also the corrosion or washing with acid.

The main parts of the furnace are an annealing retort, *a*, which is inclined toward the opening through which the material is charged and the cooler *b*, which is inclined in the opposite direction and has a water seal, both parts being connected by an arc, *c*. In the annealing process this system is filled with a non-oxidizing gas, which is lighter than air, with the result that the product to be annealed, which is led through from right to left on an endless chain is prevented from oxidizing and thus keeps its clean metallic surface. The inclined position of the retort and the water seal of the cooler are relied upon to prevent the gas from escaping. The annealing retort *a* is made up of steel castings and has a muffle-shaped cross-section. The bulb-shaped cover carries internal heating ribs, which also serve as reinforcement. The bottom has a series of guiding ledges



A Cross-Sectional Elevation of the Walther Clean Annealing Furnace

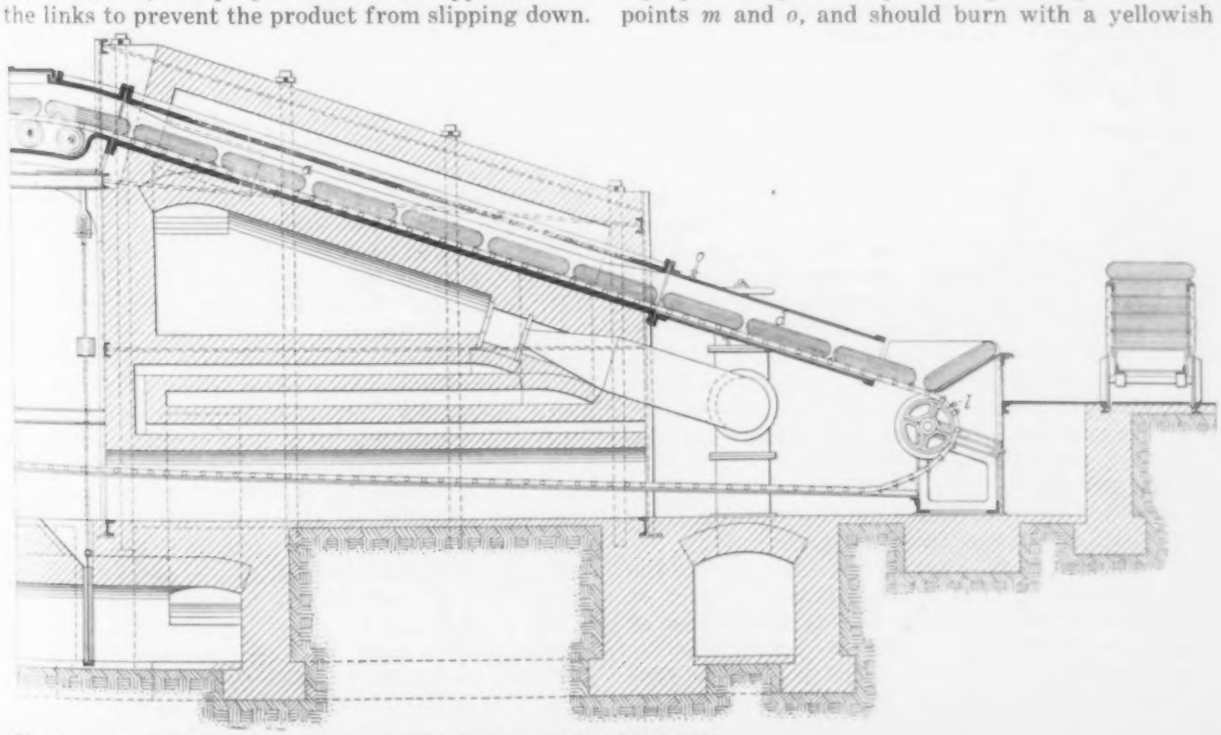


Plan View of the Furnace Showing the Arrangement of Four Units Side by Side

for conveying chain and the retort is extended downward for approximately 6 ft. by a sheet iron pipe, *d*. The retort is heated by producer gas giving a temperature of approximately 800 deg. C. in the interior, particularly at the upper end. The extension pipe *d* is freely suspended to enable the retort to expand.

The cooler *b*, which is of sheet iron, has a flat rectangular cross-section and is double walled, so that the cooling water can enter at the bottom through the valve *e* and escape at *f*. The cooler is freely suspended in the water box *g* to provide for its free expansion and the lower end is about 4 in. below the water level, thus forming a hermetic seal. An endless conveying chain, *h*, with links made of steel castings extends through the whole system. This chain, which is driven by a motor, with a gearing eccentric *j* and a ratchet and pawl mechanism *k*, has projections on the upper side of the links to prevent the product from slipping down. The ratchet and pawl mechanism consists of a ratchet wheel and driving and stopping segment with five arresting pawls, thus giving a quintuple subdivision of the pawl during the advance. In addition the stroke of the driving eccentric is adjustable, and it is possible to vary the speed of the chain to suit the requirements of the work being handled. The wheel *l* provides for the maintenance of the proper tension in the chain.

In operating the furnace the water box is filled until the opening of the cooler is covered. The test cock *m* at the lower end of the cooler is opened to permit the air to escape, after which the gas supply valve *n* on the arc *c* is opened, and the entire space is filled with gas, the air being driven out through the cock *m*. To insure a proper filling of the space the gas is lighted at the points *m* and *o*, and should burn with a yellowish



Showing the Arrangement of the Various Portions and the Mechanism

flame. When the retort has been heated sufficiently the supply valve *n* is closed, and enough additional gas is supplied at the lower end of the cooler through the valve *p* to give a continuously burning flame at the point *o*, which changes its color from yellow to blue, as a result of the annealing process. If, for example, wire coils are to be annealed, they are placed in the admission chute and are received by the conveying chain. The single coils, while lying flat and loose on the chain, are annealed in the retort, and are cooled in the cooler to such an extent that they pass without damage through the water bath, from which they are removed by the drawing-off plate. They are then placed in a hot super-saturated solution of calcium oxide, and are put on the chute leading to the drying chamber, which is heated by the waste gases from the furnace. They are taken through the chamber on a chain conveyor, which is driven by the same mechanism as the chain conveyor of the furnace. The coils are next brought back to the charging side of the furnace, and are removed on cars to other parts of the plant for further working.

The most sensitive part of the furnace is the chain, which must be renewed, either partially or entirely, at intervals. It travels along as a dead material and must be made as light as is consistent with durability. The retort suffers from burning off, particularly at the upper end. For this reason it has equal flanges on both sides, and it can be reversed from time to time to increase the durability. It is emphasized that all the other parts are exposed to hardly any wear, as the driving mechanism runs very slowly.

The capacity of the four furnaces shown amounts to approximately 30,000 kg. of wire or band iron in 24 hr. continuous working. The conveying chain has a speed of about 4 in. per min., and the total annealing period is between 15 and 30 min. for the drying chamber. Only two men per shift are required to operate the furnace, one at either open side, and these can attend to as many as six of the furnaces, as their work consists of supplying and removing the wire only. Practically no work is required for the inspection and control of the furnace.

National City Bank to Aid Export Trade

Branch Banks to Be Established Under the New Federal Reserve Act in Argentina and Brazil—Views of President Vanderlip

In pursuance of long and carefully considered plans, a definite step in the direction of fostering trade with South American countries was taken by the board of directors of the National City Bank, New York, June 30, when it authorized the president of the bank, Frank A. Vanderlip, to apply to the Federal Reserve Board, as soon as that body is organized, for permission to open branches of the bank at Buenos Aires, Argentina, and at Rio de Janeiro, Brazil. To inaugurate the work in South America, first in Buenos Aires, Robert O. Bailey, formerly assistant secretary of the Treasury, and for two years connected with the National City Bank, sailed for Europe Tuesday, July 7, on the Vaderland. He was accompanied by James C. Martine, who also is connected with the bank.

FOREIGN TRADE FINANCING TO BE EQUALIZED

When these branch banks are established it will, at least partially, dispose of a point invariably raised in discussions of the commercial disadvantages which hamper the export trade from the United States to South America—the fact that Europeans are assisted by branches of their home banks. It was to investigate this phase of the situation that the National City Bank sent W. Morgan Shuster to South America. His report, rendered more than a year ago, led to the opinion that the time was not then propitious to undertake banking there, but since then conditions have changed, the Federal Reserve Act, for one thing, having made it possible for national banks to extend their operations outside the confines of this country.

In addition to the banks to be established in the two cities named, it is probable that an agency of the National City Bank will be established later at Valparaiso, Chile, and eventually there may be branch banks in Europe. It now has a branch office in London and has assisted in financing sales made abroad by the Allied Machinery Company of America. The National City Bank began looking over the South American field about four years ago, and before the adoption of the present banking law there was under consideration the establishment of independent banks there with the backing of National City Bank stockholders.

PRESIDENT VANDERLIP EMPHASIZES SERVICE FEATURE

In commenting on the present plan to a representative of *The Iron Age*, President Vanderlip said:

"I wish to emphasize that we intend to render service to American business men in any direction in which it is legitimate for a bank to go. We will have experienced and competent men in the field who will give information as to credits, trade conditions, what the people of this or that locality buy and where they are buying it now. We hope to help the metal and machinery trades, among other lines, but it won't do for our manufacturers to cultivate the South American field only when the domestic trade is dull and let it go when home conditions are good. It must be continuous effort and not in any sense desultory. We are not being carried away by enthusiasm or excessive optimism in this matter, but we believe that there is plenty of opportunity for development in these countries in which we are going to extend our banking facilities and that Americans can sell a great deal of their manufactures there. This business must be gone after seriously and determinedly and with a realization that it is not going to be easy. I know the German people get the help of their banks in South America and we shall endeavor to render a service just as efficient and if possible more so."

He further said that the plan embraces working in co-operation with the regular consular service and with the special business agents who are to be located in important foreign cities by the Department of Commerce, Washington, whose duty it will

be to collect and forward trade information, a duty to which no consul can give his full time. When asked if it were probable that the Allied Machinery Company of America, which is affiliated with National City Bank interests and is now promoting the sale in Europe of American machine tools, would extend its operations to South America, he said he did not care to go into that subject at this time, but that such a step might be taken in the future. The Allied Machinery Company, he observed, has been an experiment.

Mr. Bailey, who was also interviewed, said that he was not leaving New York to conduct an investigation, but to take actual and practical steps for the creation of the branch banks.

An important feature of the plan which the officers of the bank have worked out is that, while a most valuable service is rendered by the Department of Commerce through its collection and dissemination of foreign trade data, it cannot well undertake, as can a bank, to supply information as to the commercial standing of firms which may seek to do business with American manufacturers or exporters. It is contemplated to place such information as the National City Bank gathers, through its branches and agencies, at the disposal of any other banks in this country which may want such assistance. The decision to aid American commerce in Argentina and Brazil was reached only after investigation had shown that there was in southern South America a great territory capable of developing an immense trade with the United States—such a market, in fact, as could be found in no other quarter of the world for American manufacturers, both because of the progress yet to be made there and because of its geographical location which will be brought nearer by the opening of the Panama Canal, now fast approaching.

DEPARTURE MAY BE FAR-REACHING

Germany, in particular, of the European countries, has assisted its South and Central American trade with branch financial institutions, managed by Germans and in close touch with local conditions. The charge has been made that where North American exporters have been obliged to transact their business with South America through European banking institutions, information as to the terms and other details have somehow found their way to European competitors to the detriment of the exporters. Once having established its branches in foreign countries, the plan of the National City Bank anticipates a market for drafts on this country. The bulk of the present foreign trade of the United States is now financed through London and in pounds sterling instead of dollars, a condition which probably will be changed, thereby opening a new field for American bankers and facilitating the exchange of goods between this and other countries.

The branch banks in Buenos Aires and Rio Janeiro will be started on a modest scale and developed as extension is justified by growing trade. The Federal reserve act provides that when a bank is authorized to establish branches abroad a specified amount of the bank's capital shall be set aside for each of the branches, but the sum which the National City Bank will set aside has not been announced. The bank has a capital of $25,000,000 and has surplus and undivided profits of more than $33,000,000. According to its report, rendered March 4, 1914, to the controller of the currency, it had total resources of $334,002,726 and deposits of $255,808,375. It is classed among the largest banks of the world.

A Mine at the Panama-Pacific Exposition

The U. S. Bureau of Mines has undertaken to construct, in co-operation with the mining industry and the manufacturers of mining machinery, a mine beneath the floor of the Palace of Mines and Metallurgy at the Panama-Pacific Exposition. The financial and operative success of the mine is assured through exhibits promised whereby typical metal and coal mining operations will be reproduced by full size working places in which mining machinery will be installed and operated. The walls of the mine will be covered with either ore or coal typical of the mine illustrated. Among others, the Copper Queen Consolidated, Arizona; Bunker Hill Sullivan Company, Idaho; Homestake Mining Company, South Dakota; Goldfield Consolidated Mines Company, Nevada; Jones & Laughlin Company, Michigan; Lehigh Coal & Navigation Company, the anthracite field of Pennsylvania; Pocahontas Fuel Company, West Virginia; Consolidation Coal Company, Kentucky, and Pacific Coast Coal Company, Washington, have each agreed to reproduce one of their working places or stopes and to contribute the sum necessary to the installation and operation. Tentative promises of similar action have been received from others.

Various mining machinery and appliances have been promised, including a mine cage and cars by the Joshua Hendy Company; a cage, hoist and motor by the Denver Engineering Works; locomotives by the Westinghouse Electric & Mfg. Company; pumps by Byron Jackson; air compressor, drills, drill sharpener and winze hoist by the Compressed Air Machinery Company, drills and coal cutters by the Ingersoll-Rand Company and the Sullivan Machinery Company; lamps by the Justrite Mfg. Company and the Koehler Mfg. Company; enamel signs by Stonehouse Enamel Sign Company.

Visitors will be given portable mine lamps and will be lowered in a very slowly moving cage while a panoramic effect of the strata lining a mine shaft will pass by them so rapidly as to produce the illusion of descending to a considerable depth. In case of crowds, these may enter by a slope. Exit will be by a slope into the radium booths of the Bureau of Mines where actual radium emanations will be shown.

There will be a motion picture room which visitors will pass in going from mine to mine. In it will be shown such great open workings as are not illustrated by the underground mines, such as those of the Utah Copper Company and those of the Nevada Consolidated Company at Ely, the iron diggings at Hibbing, Minn., hydraulic gold mining and the quarrying of building stone. Twice each day there will be an imaginary explosion or fire in some portion of the mine announced by telephone to the superintendent's office in the Bureau of Mines space on the surface, and rescue men wearing breathing apparatus will enter the mine and bring out supposed victims who will be given first aid treatment in the surface emergency hospital.

Lake Iron Ore Shipments in June

The amount of iron ore brought down the Lakes from the Lake Superior region in June amounted to 5,502,367 gross tons, as compared with 7,974,444 tons in June, 1913. The following table gives the June and season shipments by ports and the corresponding figures for 1913, all in gross tons:

	June, 1913	June, 1914	To July 1, 1913	To July 1, 1914
Escanaba	845,414	580,103	1,800,601	1,076,020
Marquette	532,736	262,075	1,059,776	383,948
Ashland	774,761	541,315	1,509,702	883,081
Superior	2,337,078	1,997,895	4,677,349	3,733,502
Duluth	1,895,728	1,045,786	3,995,948	1,779,876
Two Harbors	1,548,727	1,075,193	3,081,666	1,767,689
Total	7,974,444	5,502,367	16,125,042	9,624,116
Decrease, 1914.		2,472,077		6,500,926

The decrease of 2,472,077 tons for June, 1914, contrasts with an increase for June, 1913, of 406,889 tons. The Duluth percentage to July 1 was 18.49 this year agninst 24 78 last year, while the Great Northern dock at Superior shipped 37.40 per cent. of the total against 27.75 to July 1, 1913.

Results of Applied Scientific Management*

Despatching or Carrying Instructions into Hands of Workmen—Analyzing Machines to Rectify Design If Necessary—New Belt Bench

BY GEORGE DE A. BABCOCK†

Fig. 17 shows the method of carrying instructions from the control board into the hands of the workmen. This latter part of the plan was one of the first installations made by Carl G. Barth and is working out admirably.

The works are divided into five departments. Each department is controlled by a despatch room. In this room are maintained the route sheets which show the operations and machines upon which they are performed for each part. On the route sheet

Fig. 17—For Each of the Five Departments of the Franklin Works There Is a Despatch Room. In This Room Are Racks, Each Section of Which Represents a Machine. Cards in the Compartments Indicate Work in Progress and Work Next to Be Taken Up

is recorded the movement from one operation to the next. The room contains racks as shown. Each rack is made of sections, and each section subdivided into three parts. Each section represents a machine. This is shown by the symbol on the tag, as 5DS, meaning: No. 5 sensative drill. The front compartment in the section contains a coupon which matches a job card that is in the hands of the workmen. In the second compartment a coupon and job card fastened together show the work ahead of the machine. In the third, or back compartment, the coupon job card and small foreman's coupon shows the work in process but yet to come to the machine.

The tag which hangs beside the symbol carries the clock number of the workman if work is in process on that machine, or a tag with a machine symbol if the machine is idle. The job cards are arranged in the back compartment in order of drawing number and lot number. In the middle compartment where they are waiting at the machine they are arranged in order of date as put on by the schedule section from the control board. When a machine is started a job card and inspector's coupon are separated. Both inspector's coupon and job card are stamped with a time stamp. The job card is given to the workman and the inspector's coupon is placed in the front compartment.

Proper orders have been given and information received that the tools and equipment are at the machine before the order is given to the man. The foreman has nothing whatever to say with regard to the order of work to the machine. This being settled entirely by the order of dates, and no one except the production manager specifies the date of each of these operation cards.

In case of a machine under repair or some other interference, the route department is immediately consulted if the problem is not readily solved by the despatch clerk and the foreman in conference.

The middle compartment of the section shows at all times the amount of work ahead of the machines. This is also shown on the control board, and in addition, on this control board is shown the hours of burden on that machine.

When a workman completes his job, the card is returned, stamped, the inspector's coupon of that job is put in the inspectors' rack for inspection and the next job in order is handed to the workman. This transaction is checked on the route sheet. A move ticket is then passed out to the transportation department, which moves the lot from one machine to the next. All orders in these racks will be finished approximately within 20 working days.

Each transaction goes by the job card or move ticket to the person in charge of the control board and is there recorded.

In case any part falls behind schedule on any operation a "lot urgent tag" is placed on the job. This is a written instruction from the production manager to every one concerned that the work on the part must go on night and day with the greatest possible despatch.

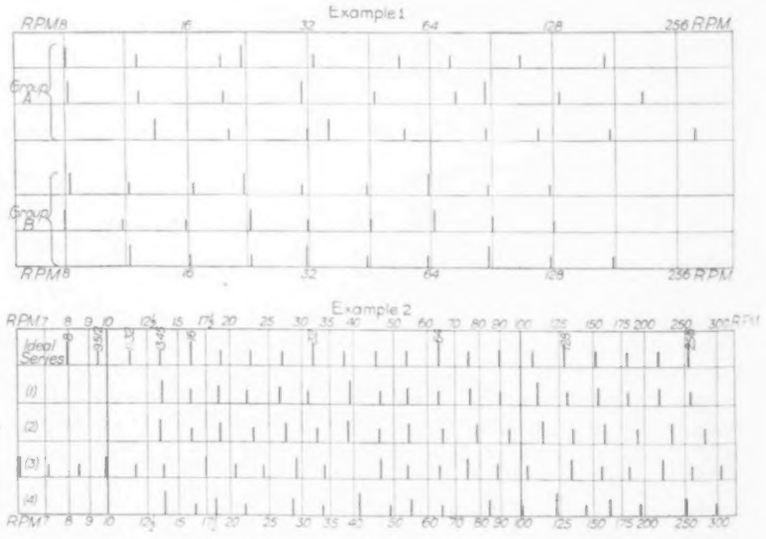


Fig. 18—Studies of a Number of Machines With Regard to the Increments of Speeds and Feeds

*Sixth installment of a paper presented to the National Metal Trades Association, Worcester, Mass., April 22. The first part, printed in the issue of June 4, told of the conditions which existed when it was determined to institute scientific management. The second part covered largely the first steps taken; the third part showed the early results achieved; the fourth part was devoted to time studies, and the fifth part described the control plan. The next and last part discusses the human factor.

†Production manager, H. H. Franklin Mfg. Company, manufacturer of the Franklin motor cars, Syracuse, N. Y.

MACHINE ANALYSIS

Before new machines are purchased the mechanical features are analyzed to determine their suitability for our work. This does not mean that they must be suitable only for a particular operation, but that the power, feeds and speeds of the machines must have the same capability as all other machines in the works used for similar purposes. Carl G. Barth has specified standard increments for feed and speed. E. C. Robertson, who has studied under Mr. Barth, resides with us as consulting engineer to carry on this work. Examples of this study are shown in Fig. 18. Mr. Robertson appends a short discussion:

In a paper given before the National Metal Trades Association in April, 1910, on "Bonus and Premium Systems," Carl G. Barth referred to one of the chief difficulties underlying such systems as being the "unevenness" of machine shop equipment. By the unevenness is meant the lack of standardization as applied to machine tools, and to parts used in conjunction with them.

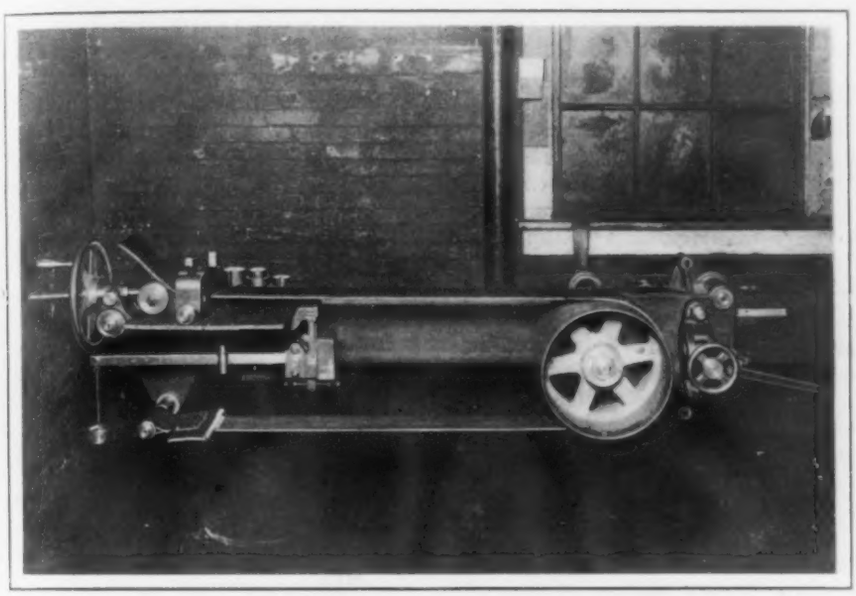


Fig. 19—Belts Are Kept at a Predetermined Tension to Insure Desired Machine Speeds. When the Proper Tension Is Obtained, the Belt Is Cut in This Belt Bench and the Ends Laced Together

In another paper given before the National Machine Tool Builders Association in the spring of 1912, Mr. Barth offered a suggestion as to a standard to be adopted for machine tool speeds and feeds. This suggestion embodies the use of a geometrical progression both for the series of spindle speeds on a machine and for the feeds provided on a machine. Inasmuch as the average tool builder to-day recognizes and uses a geometrical progression in speeds and feeds, the only important question remaining is as to whether the tool builders' progression agrees with Mr. Barth's proposed standard.

It might be stated here that this standard progression has been adopted in the Franklin plant. Hence, when purchasing a new machine tool every effort is made to find a machine agreeing with this standard. In case of the failure to find such a machine, the next endeavor is to choose a machine, which, with the fewest possible changes, can be reconstructed to agree with this standard.

In the diagram of Fig. 18, example 2 shows by the light lines a logarithmic scale. The short, heavy vertical lines plotted in this example represent spindle speeds. At the top is shown a portion of the ideal series from 8 rpm. to 256 rpm. Directly under, or in line 1, is shown the series on a certain make and size of turret lathe now in the Franklin plant. A comparison of this series with the ideal shows that it is as nearly perfect as can probably ever be obtained with the gears and their inherent limitations. As originally designed by the builder the machine did not have such a series of speeds, but was redesigned by us and ultimately furnished thus by the builder.

The machine shown in No. 2 line also has a nearly perfect series. And strangely enough this machine was designed thus without any knowledge on the designer's part of the ideal series. In Nos. 3 and 4 machines are shown which are not perfect, but which with a little study could undoubtedly be refined so as to agree very closely with the ideal. It might be stated that each one of these four represents a different make of turret lathe of practically the same size.

In example 1, Group A, shows the series on three different sizes of the same make of turret lathe. Here the light vertical lines represent speeds in a perfect progression and the logarithmic scale has been omitted. The unevenness of the speeds is here very noticeable. Group B shows the same machines after an analysis of the gear ratios had been made. The slight percentage of variation is due to inherent limitations of gears.

MAINTAINING BELT TENSIONS

The matter of belt tension is important in order to maintain the machines at standard power effort. This maintenance is assured by a belt bench, Fig. 19, designed by Mr. Barth and Mr. Oyen, and constructed in our works. The proper tension and length of the belt are determined. The weight or number of pounds tension for the belt is set on the scale arm. The hand wheel is tightened until the strain lifts the arm to a horizontal position. The belt is then cut off, laced and put into service. Tests and adjustments are frequently made to preserve the standard.

Tools are routed from a central tool room and are returned through an inspector at the completion of the operation. They are moved under orders from the despatch section and are routed by the same orders. They are handled by the transportation section and when in storage are under the control of the route and production equipment section.

(To be concluded)

Humphrey Pumps for Egyptian Government

An installation of Humphrey pumps has been ordered by the Egyptian Government for the drainage of Lake Mareotis at Mex, near Alexandria. When completed, this plant will be one of the largest pumping installations in the world, and will consist of 18 pumps, each capable of delivering 120,000,000 gal. per day through a lift of 20 ft. The present order covers 10 pumps, together with the gas producer plant, Venturi water meters, traveling cranes, etc.

The combustion chamber of the pumps will have a maximum internal diameter of 8 ft. 8 in., and its hight will be about 14 ft. The water valve box will be 8 ft. 8 in. diameter and 7 ft. high, and will be fitted with 100 valves of the hinge type.

Five of the pumps are to be made by Wm. Beardmore & Co., Ltd., Glasgow, and five by the Tecnomasio Italiano Brown Boveri, at Milan. The anthracite gas plant, capable of gasifying 44 tons per day, will be of the self-vaporizing type, and will be supplied by the Power Gas Corporation, Ltd. There will be nine producers, one of which will be a spare.

Modern American Blast Furnace Practice*

The Operation Discussed in Detail, Embracing Blowing-in, Furnace Practice and the Temperature of the Blast

BY HERMANN H. BRASSERT †

Practical experience had developed the blast furnace to a remarkable degree of efficiency long before science attempted to shed any light on the process. In the old days the blast furnace was regarded as much of a mystery, and only practical men, through spending most of their lives with it, were capable of successfully controlling its whims. Good furnace men of this caliber were naturally scarce, and being rather jealous of their knowledge they were reluctant to teach others what they had acquired through years of hard work.

It was not until the middle of the past century that men of science gave to the industry a clear understanding of the important reactions in the furnace. This at once led to the realization that the process could be scientifically controlled, and soon the chemical laboratory was universally called upon to assist in regulating furnace operation. Then started a gradual transformation of furnace practice and, to speak in medical terms, the former curative or surgical methods were replaced by preventive treatment. The composition of the charges being known, the analysis of the resulting product could now be determined in advance, and its quality controlled with far greater certainty.

With the better selection and preparation of raw materials, more suitable furnace construction, better blowing equipment and stoves, the furnace operation became more and more a science; the more accurate knowledge as to the causes and effects of the detrimental reactions enabled the furnace manager to more successfully counteract them. While it was the essential qualification of the old type of furnace man to be expert in getting a sick furnace out of trouble, a task at which he gained plenty of practice, nowadays scientific management is expected to keep the blast furnace out of trouble and through perfect control of raw materials and furnace practice establish a uniform, economical operation.

BLOWING IN

Having established the correct lines the foundation of a successful furnace campaign is laid by the utmost care and caution in blowing in. After a thorough drying of the lining the fire should be lighted simultaneously and uniformly all around the hearth and be given the opportunity to penetrate quickly into the center of the furnace. Whether a wooden scaffold is used for preheating the coke charges before they reach the bottom, or the hearth is filled with coke and a pipe is inserted through the tapping hole to carry part of the combustion downward, either method thoroughly heats the bottom and the first casts are of good grade and can be tapped without difficulty.

The proper stepping up in weight of burden and wind can only be established by experience. If in doubt, it is better to err on the slow side. In order to avoid channeling on the walls on the one hand, and building up on the bosh on the other, the tuyere area should be increased in proportion to the amount of wind blown.

To establish a low top temperature from the very first, the burden should be increased in advance of the wind. In this manner a new furnace can be made to carry the highest possible ratio of burden in the second week of operation. By gradually following with the wind volume and bringing higher blast heats into play, it is possible to maintain this heavy burden and reach a high production on a low fuel consumption with a comparatively small amount of wind blown. This practice saves the new lining and permits it to become thoroughly seasoned and hardened. The first slag should not be so acid as to scour the walls nor so basic as to accumulate on the bosh. It should be just "limey" enough to liberate graphite from the iron and form a thin protective coating on the brick work. To maintain a most nearly perfect slag, every preference in the selection of raw materials should be given to a new furnace. As the lining becomes older it becomes more seasoned and suffers less variations.

FURNACE PRACTICE

After the furnace assumes its proper pace, which means such a rate of driving as can be maintained without decreasing the previously established maximum ratio of burden, there should be as few radical changes as possible. The most advantageous unit of burden charge must be established by experience for each type of furnace, as well as the best method of dumping, and these should be varied only if the necessity for a change is definitely proved.

Any variation in the temperature and analysis of slag and iron should be promptly recognized and counteracted, at first by applying the reserve heat, then, if proper diagnosis indicates the necessity, by decreasing the burden. It should be borne in mind that "a stitch in time saves nine," and a slight change in heat or a small decrease in burden, quickly applied, will generally prevent more serious trouble. Coke blanks should be avoided as much as possible, as strong remedies of that nature tend to make the furnace fluctuate and disturb the desirable working lines which previous economical practice has formed.

THE TEMPERATURE OF THE BLAST

The average blast temperature carried on furnaces burdened with Mesaba ores seldom exceeds 1100 deg. F., ranging far lower than the blast heats commonly applied in European practice, and also lower than on most of our Eastern furnaces using magnetic ores. This is due to the fact that with the easily reducible Mesaba ores very low fuel consumption can be attained with comparatively low blast heats, providing the distribution and the furnace lines are correct. In fact, it occurs that furnaces operating with high blast heats side by side with furnaces using low blast heats, will require more coke, simply because in the latter heating and reduction are carried on more economically.

*Third portion of a paper presented at the New York meeting of the American Iron and Steel Institute May 22. The other two installments appeared in *The Iron Age*, June 25 and July 2.

†Superintendent of blast furnaces, Illinois Steel Company, South Chicago, Ill.

A good illustration of this is the difference in results on new against worn linings. The frequent failure to obtain any saving with high blast temperatures, coupled with the other common experience of Mesaba furnaces refusing to "take" the high heats has at many plants resulted in delaying the improvement of stove equipment and gas washing, so that even where the value of higher heats is recognized they are now often not available.

The ability to use high blast temperatures is determined by three factors: First, the physical condition of the stock in the furnace; second, the chemical and thermal conditions in the hearth; and third, the CO_2 to CO ratio in the gas. The first condition is determined by the physical character of the raw materials, their distribution in the stack, and the furnace lines, all of which influence the permeability of the stock column. The second condition is influenced by the fusibility and fluidity, as well as volume and basicity of the slag, which are generally determined by its duty of sulphur elimination. The third condition depends on the reducibility of the ores and the grade of iron to be produced.

Uniformity in every respect will greatly facilitate the use of high heats, even if one or the other of the premises mentioned should not be favorable. A sudden increase of blast heat raises the hearth temperature and renders the slag more "limey" by reducing more silicon into the iron. With a dense stock column this will frequently cause an increase in blast pressure and will retard the action at the tuyeres, a condition which is aggravated by coke of slow combustibility and too small a cinder volume. A low percentage of slag will not only exaggerate the variations in analysis but will prevent the free descent of the stock and the desired penetration of the hearth, particularly when the shrinkage of the materials in the bosh through fusion is less than that required by the bosh angle. With high or flat boshes a greater cinder volume is necessary to insure smooth working with high blast heats than with low steep boshes.

Eventually the movement of the charges may stop altogether, and the furnace hangs. By then lowering the blast temperature the fusion zone can be extended until it reaches the plastic, limey agglomerations suspended in the bosh; and with the reduction of hearth temperature the slag again becoming more acid and fluid, the materials begin to melt and the stock column resumes its regular movement.

The greater the number of different elements contained in a slag the greater is its fluidity. This depends on the ability of the various components to enter into solution with each other, and must not be confused with the fusibility of slags. The latter is mainly determined by the chemical composition, and varies greatly with the proportion of the different components and their tendency to form new combinations with each other. The same element which in certain percentages will render the slag more fusible will, if present in different proportions, render it highly infusible. It is one of the blast furnace operator's chief duties to so select his burden that the resultant slag will have the most suitable fluidity as well as fusibility. A transgression beyond the established range of desirable fluidity and fusibility, in either direction, is detrimental.

To permit high heats being carried and enable the furnace to work freely with a low melting zone, the slag must be kept uniformly acid. Once the melting process is carried too high up, the original bosh line is raised, the brick work above the bosh wears back, the bosh becomes too high, and any attempt to again lower the zone of fusion by the application of high heats and increased burden results in irregular operation by suspending the unmelted stock on the previously formed angle. This is why high heats cannot generally be used on a worn lining.

Under otherwise favorable conditions the use of high heats is often a matter of education on the part of the furnace crew. With the unavoidable variations in raw materials it is easier to operate on lower blast heats a lighter burden, and with richer gases, because of the greater margin of safety with plenty of heat held in reserve. The use of very high heats requires constant watchfulness,

Table 1—Average Blast Furnace Practice.—Year, May 1st, 1913, to May 1st, 1914. Pounds per Ton of Iron.

	Avg. daily prod.	Ore scale cinder	Coke	Stone	Excess of scrap used over prod.	Flue dust prod.	Per cent Mesaba ore	Actual yield	Cu. ft. of air per min.	Blast pres.	Temperature		Analysis of iron			Analysis of slag			
											Blast	Top	Sil.	Sul.	Mn.	SiO_2	Al_2O_3	CaO	MgO
Bessemer	501	4,136	1,927	863	23	207	73.9	53.63	48,850	15.3	1,068	330	1.39	0.034	0.68	35.60	13.44		2.06
Basic	493	4,471	1,961	849	51	160	85.5	49.08	45,660	16.3	996	266	0.97	0.038	1.72	34.71	14.48		3.40

Table 2—Extent of Coke Saving with High Heats and Favorable Lines in Bessemer Furnaces. Pounds per Ton of Iron.

	Avg. daily prod.	Ore scale cinder	Coke	Stone	Excess of scrap used over prod.	Flue dust prod.	Per cent Mesaba ore	Actual yield	Cu. ft. of air per min.	Blast pres.	Temperature		Analysis of iron			Analysis of slag			
											Blast	Top	Sil.	Sul.	Mn.	SiO_2	Al_2O_3	CaO	MgO
"E" furnace:																			
Sept. 1913	525	4,012	1,691	677	88	175	92.9	53.24	47,750	15.1	1,225	317	1.30	0.034	0.61	36.25	10.21	45.58	2.13
Oct. 1913	514	4,047	1,711	774	113	171	93.0	52.85	46,390	16.2	1,251	306	1.48	0.043	0.60	37.40	11.47	46.55	2.07
Dec. 1913	536	3,852	1,705	780	109	201	83.7	55.69	45,510	15.7	1,250	300	1.33	0.041	0.71	36.12	11.48	48.46	1.96
No. 4 furnace:																			
Mar. 1914	518	4,062	1,744	781	17	193	67.4	54.76	41,140	15.7	1,170	274	1.29	0.025	0.59	33.48	15.67	45.39	3.85
Apr. 1914	543	4,003	1,702	752	73	227	66.5	54.40	42,950	16.0	1,196	283	1.23	0.027	0.56	34.63	15.01	45.63	2.83

and any slight change in the furnace must be quickly perceived and counteracted.

The cost of heating the air increases with the degree of temperature, and simultaneously the rate of coke saving decreases; so that in practice the economical limit of high blast heats generally lies below the theoretical one, which is reached when the gases lack the necessary preheating and reducing power. In the case of Mesaba ores, which are easily and quickly reduced by the gases, fast driving is possible without running into "direct" reduction; and lean gases, low top temperatures, and a low fuel consumption are reached by the use of moderate blast heats, as illustrated by data of the South Works furnaces in Table 1.

To indicate the extent of coke saving which is obtained, even in Mesaba practice by the application of higher heats than the average shown in Table 1 on furnaces with favorable lines, the data in Table 2 gives the monthly practice of Bessemer furnaces using less than 1750 lb. of coke per ton of iron.

Where less reducible ore mixtures are used, part of the reduction must be accomplished by solid carbon, the top gases are richer, and a much greater margin is left for fuel saving with high blast temperatures.

Uniform furnace practice demands that the blowing engines be so governed as to deliver a constant quantity of air and not to maintain a constant pressure. The smelting of fine ores requires still greater care and accuracy in this respect, and this has led to the effort to deliver a constant weight of oxygen to the furnace at all times. Where the Gayley dry blast is used, this is accomplished simply by maintaining a uniform speed of the blowing engines. Turbo blowers can be governed by a regulating device in the air inlet which automatically delivers a constant weight of air but without a correction for varying moistures. Reciprocating engines running on natural air can be made to deliver a constant weight of oxygen by varying the revolutions according to atmospheric changes. To derive the benefit of lower temperature and moisture, the air shown be drawn from the outside of the engine room.

With all of these adjustments there still remains the error of the varying volumetric efficiency of the blowing tubs, leaky valves, mains, stoves and connections. These are generally in excess of any assumption. Even when proper deductions for clearance and valve losses have been made, the actual air required to burn the carbon contained in the charges and available for combustion at the tuyeres is less than that calculated from the blowing engine revolutions. Engines equipped with modern automatic valves show better results in that respect; and turbo blowers, by obviating the pulsation, give the highest actual delivery. For better control it seems highly desirable to measure the air by installing a flow meter in the cold blast main of each furnace. The practical possibility of applying flow meters to the cold blast main is now being demonstrated at South Works, where an instrument has been installed on one furnace and is giving very promising results.

In Germany it is the practice at several plants to blow with all the gas engines into a common main for all furnaces of a group. The engines are operated at the most economical speed. The blast pressure is held uniform and slightly above the maximum furnace pressure. The volume of air for each furnace is regulated by an automatic valve in connection with a flow meter. This system should give good results at plants where the blast pressure varies but slightly, and in connection with gas engines which, on account of their low gas consumption, can be operated against an increased blast pressure without materially affecting the blowing cost. With steam-blowing engines, where the fuel consumption constitutes the largest item of cost, and in practice where the blast pressures vary, this method cannot be considered.

A furnace will, at times, without any change in the wind or raw materials, start to drive faster, taking more charges. In this case the carbon introduced with the additional rounds of burden is consumed in the "direct" reduction with the ores or by solution in CO_2. In the combustion at the tuyeres the constant weight of oxygen blown can combine with only a certain constant amount of carbon to CO, generating a fixed quantity of heat. Therefore, the additional coke charged must be consumed by the oxygen in the ores or dissolved by CO_2. Under these conditions a furnace will run cold, unless sufficient blast temperature is applied to balance the heat lost by the "direct" reduction and solution in CO_2 as well as that required for the melting of the additional ore charges. If enough blast heat is not available, the wind must be diminished in order to re-establish the former equilibrium of "indirect" and "direct" reduction, and avoid the necessity of lightening the burden.

(To be continued)

Biilings & Spencer Company to Expand

One of the largest industrial deals recently closed is the sale of the Columbia Motor Works of the Maxwell Motor Car Company at Hartford, Conn., to the Billings & Spencer Company, manufacturer of wrenches and other small steel tools and drop forgings. The property has a frontage of 1024 ft. on Park street, 221 ft. on Laurel street, and comprises about 8¼ acres of land, on which stand many substantial brick buildings, having a total floor area of 227,952 sq. ft. It is on the main line of the New York, New Haven & Hartford Railroad, with a spur track running into the plant.

The original Columbia plant was erected by the Pope Mfg. Company about 1894 for the manufacture of seamless tubes for bicycle frames. Subsequently it became the motor carriage department of the company, which eventually passed through a receivership. The Maxwell interests then acquired possession of the plant. About a year ago the bulk of the machinery was sold. Having no use for the Hartford shops, they were put on the market.

The Billings & Spencer Company has outgrown its present location, corner of Lawrence and Russ streets, Hartford, and in purchasing the Columbia factory will have chance to expand. Possession will be taken immediately, though the company will move gradually in the most economical way and with no interruption of business. In the new location the company will enlarge its line of wrenches and small tools, and also its drop forgings of larger size, and increase its present force of 600 employees by at least one-third.

The Billings & Spencer Company was organized in 1872, its business has grown steadily and Billings & Spencer wrenches and tools are known all over the world. The company manufactures 23 lines of wrenches and ships in carload lots. It also has a large business in heavy drop forgings and a big market in Detroit and the Middle West in automobile forgings. It turns out from 10,000 to 12,000 tons of steel forgings yearly. Officers of the company are as follows: President, C. E. Billings; vice-president, F. C. Billings; treasurer, Lewis D. Parker; secretary, E. H. Stocker; assistant secretary, F. H. Stocker.

The business of the Metallic Packing & Mfg. Company, Elyria, Ohio, will be conducted hereafter by the Martell Packing Company, which was recently organized to succeed the former company.

American Society for Testing Materials

Annual Meeting at Atlantic City Marked by the Adoption of Important New Specifications and a Large Attendance

A large list of new specifications indicative of earnest and laborious work on the part of the committees, and an attendance of enthusiastic members exceeding that for some years, marked the seventeenth annual meeting of the American Society for Testing Materials, at the Hotel Traymore, Atlantic City, June 30 to July 3. An unusually heavy program of 64 papers and committee reports testifies to the magnitude of the society's endeavors. Since the last annual meeting 401 committee meetings were held and 79 sub-committee meetings with a total attendance of 1100.

An important feature of Tuesday evening's session was the discussion of Prof. Edgar Marburg's paper on "The Procedure Governing the Adoption of Standards," referred to last week. Professor Marburg's suggestion that the inefficiency of the letter-ballot had been demonstrated and that the adopting of specifications be left to a two-thirds vote of the respective committee was almost unanimously concurred in by those participating in the discussion. A feeling of gratification was apparent at the outcome of this suggestion and while it was referred to the executive committee for action, no doubt remains that the work of the society will be simplified and made more expeditious.

EFFECT OF SIMPLE OVERSTRAIN

Considerable interest was manifested in Prof. Henry M. Howe's paper: "Are the Effects of Simple Overstrain Monotropic?" This paper points out the need of further study to show whether the strengthening effect of prior overstrain, by cold rolling, cool rolling, wire-drawing, etc., is effective or fictitious as regards the endurance of repetitive stresses whether of constant or reversing sign. It considers further how the effects of overstrain are related to the direction of the deformation which the overstrain causes. The paper was considered by some steel men as raising the question of the advisability of cold rolling various forms of steel.

George E. Thackray, of the Cambria Steel Company, in discussing the paper, stated that the properties of hot-rolled and cold-rolled steel differed, citing electric street railway axles and cables of large diameter. These have given excellent results in spite of millions of repetitive stresses. In his opinion either hot or cold rolled material, if subjected to stress and allowed to rest, will readjust itself, and hammering and rolling steel is for the purpose of improving its properties.

Supplementing the discussion of this paper J. S. Macgregor, of Columbia University, presented the results of an interesting series of tests, which had been made to ascertain the difference in physical properties of cold rolled bars shortly after rolling, after they had been at rest for a year and also the effect of annealing at 600 deg. C. Three specimens of cold drawn steel, containing 0.40 to 0.50 per cent. carbon were cut in two. Three bars were tested at once while the other three were annealed at 600 deg. C. and after ageing for more than a year, tests were made on them to ascertain whether there had been any change in physical properties, with the following results:

	First 3 bars	Bars annealed and aged
Elongation, per cent	13.2	16.5
Reduction of area, per cent	29.3	34.5
Yield point, lb. per sq. in.	68,277	73,893
Tensile strength, per sq. in.	104,173	97,273

An increase in elongation of 3.3 per cent.; in reduction of area an increase of 5.2 per cent.; and in yield point an increase of 5616 lb. per sq. in. while in tensile strength a decrease of 6900 lb. is shown in the annealed and aged bars as compared with the others.

Mr. Macgregor also said that several weeks ago he had received three cold drawn bars of 0.40 to 0.50 carbon from a manufacturer. These were cut in two, one set being tested untreated and the other set annealed at 600 deg. C. with the following results:

	Untreated Bars	Annealed Bars
Elongation, per cent	13.1	19.1
Reduction of area, per cent	41.6	47.7
Yield point, lb. per sq. in.	62,373	61,517
Tensile strength, per sq. in.	86,973	83,161

The annealed bars show an increase of 6 per cent. in elongation and 6.1 per cent. in reduction of area but a decrease of 856 lb. per sq. in. in yield point and of 3812 lb. per sq. in. in tensile strength.

THE STEEL COMMITTEE'S REPORT

The fourth regular session of the convention, the first one regularly devoted to steel, was opened Wednesday morning with Capt. Robert W. Hunt in the chair. The report of the committee A-1 on standard specifications for steel was the first business taken up. In the absence of C. D. Young, chairman of the committee, the report was presented by J. A. Capp, General Electric Company, Schenectady, N. Y. Mr. Capp called attention to various important features of the work of the past year, as embraced in a printed pamphlet of 106 pages. The large and growing personnel of the committee, the creation of sub-committees on new subjects and the increasing number of specifications in charge of the committee—at present there are 30 such specifications, or nearly one-half of the total of 64 issued by the society—has shown the necessity of conducting the increasing work of the committee under broad regulations designed to systematize the routine work so far as possible without restricting in any way the freedom of action of the committee or its sub-committees. Therefore new regulations governing this committee have been drawn up and adopted. They provide for the creation of an advisory committee composed of the chairman of sub-committees, in which is vested the executive direction of the committee. The meetings, held since the regulations were adopted, warrant the expectation that its affairs will be conducted more smoothly in the future.

The membership of the committee has been increased from 93 last year to 108, comprising 71 non-producers and 37 producers. There are 15 sub-committees including the advisory committee. The three former sub-committees on axles, on forgings, and on blooms, billets and slabs, have been merged into a new sub-committee, VI, on forgings, to which have been added members of

the former sub-committee on locomotive materials interested in forgings. The former sub-committee on locomotive materials has been changed to sub-committee XI on boiler steel, forging and structural steel for locomotives being placed in the charge of the sub-committee on forgings and structural steel respectively. A new sub-committee, XIII, on methods of physical tests has been created.

Importance attaches to the number of meetings held by this important committee since the last convention. There have been three meetings covering eight sessions with an average attendance at each meeting of 46 persons, representing 40 members. At the last meeting, covering four sessions, 58 members or over half of the total membership of 108 were present or absent with excuse. During the year 24 sub-committee meetings have been held with an estimated total attendance of 250 members and invited guests.

The most important single recommendation of the committee is with reference to the revision of the forging specifications. This sub-committee, consisting of 31 members, held six meetings with an average attendance of 22 members or over two-thirds of the total membership. Two of the six meetings covered two days; including evening sessions practically 9½ days have been spent by the sub-committee in revising the forging specifications. This is cogent evidence of the thoroughness of the work of the committee and the society.

THE NEW SPECIFICATIONS

The new and revised specifications submitted by the committee were enumerated in the last issue. Only one new specification elicited any comment, that for steel forgings and billets, to which so much time of the committee had been devoted. These were presented by the chairman of the sub-committee, A. A. Stevenson, and covered three specifications: carbon steel and alloy steel forgings, quenched and tempered carbon steel axles, shafts and other forgings for locomotives and cars, and carbon steel forgings for locomotives. The first and last of these entire new specifications were referred to letter-ballot of the society without discussion. To the second specifications—those covering quenched and tempered carbon steel axles, shafts and other forgings for locomotives and cars, a minority report was presented from the American Electric Railway Engineering Association by Norman Litchfield as representative and J. P. Barnes and W. E. Johnson as special representatives. The minority report was substantially as follows:

As representatives of the American Electric Railway Engineering Association on committee A-1 on standard specifications for steel and its sub-committee VI on steel forgings, we wish to protest against the action which the committee has taken in submitting to the society a proposed revision of the present standard specifications for heat-treated axles, shafts, and similar objects, without due consideration being given to the wishes of the American Electric Railway Engineering Association and before it could have the attention of that Association at its annual meeting. The first specification covering this class of material was originated by one of the member companies of the American Electric Railway Engineering Association, and then adopted by that Association, which later, at the solicitation of some of the members of the American Society for Testing Materials, entered into joint consideration with that society in the production of the present standard specifications of the society entitled "Specifications for Heat-Treated Axles, Shafts, and Similar Objects." The specifications which committee A-1 now proposes are general, covering axles, shafts, and other forgings for locomotives and cars, and would consequently supersede the present specifications for heat-treated axles. To this the representatives of our association strongly objected in the meetings of sub-committee VI and Committee A-1, as the requirement of the new specifications, while in some respects an improvement over those of the existing specifications, do not, in the main essentials, retain the high standard set by the original specifications, and particularly with reference to the elongation and reduction of area, required to be not less than 22 and 45 per cent respectively for all tensile strength above a minimum of 85,000 lb. per sq. in. It is proposed to place the elongation and reduction of area on a sliding scale basis, such that with a tensile strength of 85,000 lb., an elongation of 23.5 per cent. is permitted as a minimum, with 91,000 lb., 22.0 per cent. as a minimum, and with 97,000 lb., a minimum of 20.6 per cent. as the ultimate limit is reached; and with the tensile strength of 85,000 lb. a minimum reduction of area of 44.7 per cent. is permitted, with a tensile strength of 90,000 lb., a reduction of area of 42.2 per cent. is permitted, scaling down to a minimum of 39.2 per cent, for a tensile strength of 97,000 lb.; covering forgings of various sizes within the range of standard driving axles for electric railway work.

While it is frankly admitted that in no instance will the minimum reduction requirements of the proposed specifications be as high as those of the present specifications, it is claimed by certain members of committee A-1 that the above arrangement should actually result in a higher minimum requirement for the elongation than that called for in the present specifications for this class of material. We do not agree with this contention, and base our opinion in this respect on experience which has shown us that even with the incentive to keep the tensile strength low in order to meet the elongation and reduction requirements of the present specifications, in the majority of cases the tensile strength exceeds 91,000 lb. per sq. in. Moreover, in the specifications as proposed, the tendency will be greatly in favor of a high tensile strength, as this will not only permit of a reduced elongation and reduction requirement, but will also result in a lower elastic ratio.

After having submitted argument in favor of retaining practically the present physical properties and made motion to this effect, which was lost by negative vote of all members present at the meeting of committee A-1 held in Philadelphia on April 3 and 4, 1914, but without any explanation in support of action taken, or submitting any evidence to indicate that there was any reason for not supporting this motion, the representative of our association endeavored to have the title changed to read "Specifications for Quenched-and-Tempered Carbon-Steel Axles, Shafts and other Forgings for Locomotives and Trailer Axles for Cars," in this way excluding electric motor driving axles and armature shafts. A motion to this effect was lost, notwithstanding the fact that the argument has been made that if it were defeated you were overruling the wishes of the originators of the specifications, without explanation, in our opinion, justifying your action.

The executive members of our association exceedingly deplore this action, feeling that as the specifications in question had been adopted by this society after being suggested by our association, and after co-operative consideration with this society, it should not be modified by you without direct consultation with the American Electric Railway Engineering Association, which is the engineering representation of the electric railway companies—extensive users of this material, for which these specifications are intended. Our executive members feel that such action cannot help but jeopardize the value of the co-operative work of the two societies.

A brief discussion participated in by W. E. Johnson on the one hand and A. A. Stevenson, J. A. Capp, J. R. Onderdonk and S. V. Hunnings on the other hand followed, the preponderance of opinion being in favor of the work of the committee and the new specifications. A motion to change the title of the specifications to embrace only locomo-

tive and trailer car axles was lost by a large majority. The committee insisted, as a result of its deliberations, that the specifications proposed by the American Electric Railway Engineering Association were not commercially practicable. Mr. Stevenson said that the whole matter was a question of ductility and that the new specifications insured first-class material, whereas Mr. Johnson felt that if the proposed specifications go into effect, care in heat-treatment will not be as necessary as otherwise, that only the higher tensile material was desirable. A motion to change the title of the specifications to accord with the opinions of the American Railway Engineering Association, as expressed in the minority report, was lost by a decisive vote.

NEW RAIL SPECIFICATIONS

In presenting its report on the proposed revised specifications for carbon-steel rails, the committee, through the chairman of the sub-committee in charge of this work, William M. Kinney, Chicago, stated that, in its opinion, the present rail specifications of the society are not in accordance with the best current practice and that the society should not continue to put forward specifications which cannot recommend themselves strongly to present-day usage. The present standard specifications have been entirely rewritten therefore. Their form agrees with that of the specifications of the American Railway Engineering Association, Bessemer and open-hearth rails being covered by one specification.

The detailed changes are numerous and are fully outlined in the report. The carbon and manganese contents have been slightly increased in Bessemer rails and a slight increase in the carbon content of open-hearth rail steel has been made in some of the sections, but in the main it is very slight in all cases. As to discard the present specifications provide for the stipulation of a fixed minimum discard, subject to agreement, from the upper part of the ingot, while the proposed specifications require sufficient discard to secure sound rails without fixing a minimum discard. In physical requirements in the present specifications the drop test is made to guard against brittleness only, whereas the new proposed specifications, in addition to a test for brittleness, incorporate determinations of the ductility or toughness as opposed to brittleness and also soundness.

The question, brought up at the last annual meeting, of the relation between yield point and tensile strength was also reported upon by the committee. Tests to determine (1) the ratio of yield point to tensile strength and (2) the effect on that ratio of the speed of the testing machine, for structural and forging steels at gauge lengths of 2 and 8 in., are being made by the Baldwin Locomotive Works and the Standard Steel Works Company. The co-operation of the Bureau of Standards and the Pennsylvania Railroad Company in the program of tests for the ensuing year has been secured, and the committee hopes to be able to present final recommendations at the next annual meeting.

STEEL FOR BRIDGES AND BUILDINGS

Changes in the sulphur requirements of the specifications for structural steel for bridges and buildings were made changing the limits from 0.04 to 0.045 per cent. while the tensile strength of rivet steel was lowered in its range of 48,000—58,000 to 46,000—56,000 lb. per sq. in.

A new grade, the intermediate, of plain and deformed bars was added to the specifications for billet-steel concrete reinforcement bars, the three grades now standing: structural steel with a minimum tensile strength of 55,000 lb. per sq. in.; the intermediate with a minimum tensile strength of 70,000 lb., and the hard with a minimum tensile strength of 85,000 lb. per sq. in.

A prominent feature of this report is the recommendation of the committee as to proposed new methods of chemical analysis for plain carbon steel. Very careful thought has been devoted to this work by sub-committee XII, Charles H. Gibboney, chairman, and the results are reflected in a compilation of the best methods for the accurate as well as the expeditious determination of carbon, manganese, phosphorus, sulphur, silicon, copper, nickel and chromium.

Only two papers were presented at the morning session of the society, one on the "Magnetic Habits of Alloy Steels," by Dr. J. A. Mathews, general manager of the Halcomb Steel Company, Syracuse, N. Y., and one on "A Failed Axle: Study of an Internal Transverse Fissure," by Robert Job, Montreal, Canada. Charles W. Burrows, Bureau of Standards, Washington, D. C., expressed his appreciation and admiration of Dr. Mathews' paper and said that his own experience corroborated the conclusions of the author.

FISSURES IN FAILED AXLES

The paper by Robert Job: "A Failed Axle: Study of an Internal Transverse Fissure," presented a rather interesting phase of the internal transverse fissure problem in that it exhibited the existence of such a defect inside of an axle. In the discussion Capt. Hunt called attention to the interesting character of it and expressed his opinion that transverse fissures usually originate in the mill, whether in axles or rails. Prof. William Campbell, Columbia University, stated that when an axle failed the cause was often attributed to recrystallization due to vibration which he did not think was usually correct. In his opinion there were two principal causes of failed axles: (1) A difference in structure due to spots high in sulphides or to slag inclusions and (2) a rough fracture throughout the section, caused by improper heat-treatment. He showed a few slides bearing out his contentions.

Dr. Howe asserted that an axle often broke because its interior was called upon to elongate more than it could. He felt that internal cracks or fissures in axles often arise when an ingot is thrown cold into a hot furnace and he expressed his disapprobation of manufacturers who showed a lack of conscientiousness which allowed them to do this, as illustrated by Mr. Job's photomicrographs.

J. H. Onderdonk, engineer of tests, Baltimore & Ohio Railroad, said that 15 years' experience with axles showed similar results, at times some of those breaking revealing cavities similar to the axle reported upon by Mr. Job.

SULPHUR IN CAST IRON

Cast-iron took up a large part of the Wednesday evening session which was presided over by Dr. Richard Moldenke, who presented the report of committee A-3 on standard specifications for cast-iron and finished castings. He stated that the work of the committee the past year had been devoted to the revision of two of the standard specifications originally issued, those for locomotive cylinders and for malleable castings. He called attention to

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ESTABLISHED 1855

THE IRON AGE

Published Every Thursday by the DAVID WILLIAMS CO., 239 West Thirty-ninth Street, New York

W. H. Taylor, *Pres. and Treas.* Charles G. Phillips, *Vice-Pres.* Fritz J. Frank, *Secretary* M. C. Robbins, *Gen. Mgr.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: Equitable Building. Philadelphia: Real Estate Trust Building. Cleveland: New England Building. Cincinnati: Mercantile Library Building.

Subscription Price: United States and Mexico, $5.00 per year; to Canada, $7.50 per year; to other foreign countries, $10.00 per year. Entered at the New York Post Office as Second-class Mail Matter.

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The Meeting on Testing Materials

Progress in specification making is going on apace in the American Society for Testing Materials. A conspicuous feature of last week's meeting of the society at Atlantic City was the showing in the development of the specification machinery. To the casual observer such a well lubricated system has been perfected that a good output may be expected at every meeting. The impressions speak volumes for the proficiency of the society and the good reason for its existence. Not so evident is it that the result comes from the earnest and conscientious efforts which its numerous committees are putting to the work in hand. The diminishing need of open and sometimes acrimonious discussion at meetings on the presentation of a committee report tells how much more thoroughly the work must be threshed out in committees than was formerly the case. The situation goes to prove the wisdom of the larger committees now in existence, but also indicates how vital to the conferees the problems under consideration are. It is certainly a commentary on the desire for progress that both producers and non-producers arrange for the really frequent committee meetings.

The society enjoys the advantage of having among its members the representatives of large buyers of material, and every such meeting as that which took place last week, with its presentation of new and revised specifications representing largely the compromises of buyer and seller means that much more added influence toward the successful consummation of work yet to be undertaken. Added to this is the formal publication of the results of the recent international conferences, which indicate that international agreement on certain specifications are not necessarily so far away. These other developments are, of course, to no large extent the result of the triennial congresses of those expert in materials of construction, but the American society, of course, has been a conspicuous participant in the international movement. Conditions of world commerce enter naturally quite largely into the international problem, but one reason for the successes of the American society, an outcome of the make-up of its committees, is that its productions represent ideal requirements modified by commercial considerations.

A word may be said of the increasing attention which is being paid to things somewhat apart from specifications, but things which are involved in establishing standards. One of these is the drawing up of what is termed "recommended practice" in the treatment of metals, for example, such as annealing, heat treatment and the like. Physical characteristics are sometimes so dependent on the handling or treatment the material gets that one can see the wisdom of establishing standards of practice. In the same line is the establishment of methods of chemical analysis involved in the study of materials of construction.

New Construction by Small Interests

A compilation made by the New York Journal of Commerce shows that new incorporations in the Eastern States in the first half of this year were much smaller than in the corresponding period of last year, but that the decrease was almost wholly in large incorporations, involving a capitalization of $1,000,000 or over. As to companies with less than $1,000,000 stock, but not less than $100,000, there was practically no decrease. The figures give some support to a theory that the trend toward "big business" has decreased and that relatively small business is coming to the front.

In the steel industry some slight evidences are to be noted of such a trend. While new construction is light in this industry at present the proportion undertaken by relatively small interests is larger than was the case two years or five years ago.

If such a trend in the steel industry is really taking place, and to prove absolutely that such is the case undoubtedly requires much more evidence than is now available, there is no occasion to ascribe it to a common cause affecting all business and favoring smaller undertakings. From what is now known, one may rather ascribe it to changes in the character of the industry itself. The tendency is stronger than ever before toward specialization in the character of steel—adapting it to different uses.

Fifteen years ago, 90 per cent. or more of all the steel made, outside of rail steel, and that was practically "rail steel" and nothing more, was common ordinary steel—interchangeable, so to speak. Today it is doubtful whether as much as 50 per cent. of the orders for finished steel products involve ordinary or interchangeable steel. In perhaps the majority of cases the buyer does not particularly specify a certain description of steel, but the seller knows his requirements and furnishes steel in accordance with his knowledge. Sometimes, indeed, the seller regards it as the safer course not to discuss too minutely the factors which enter into the production of steel suited to the customer's requirements, lest the customer become so well posted that he may call

elsewhere for the same description of steel. The seller in such cases trusts simply to his own knowledge, and hopes that experimental buying from others will lead to uncomfortable results.

While the large steel mills are certainly as able to make special steels as smaller mills, it does not follow that trade will necessarily gravitate to them. There is a subtle influence in the words: "Oh, that is our specialty!" Again, in the case of a finishing mill buying its steel, there is a delay as well as a chance for confusion, in securing the particular description of steel desired to fill an order for the finished product. Moreover, there is doubtless in many cases a hesitancy on the part of the finishing mill as to confiding to the steel mill information as to the character of steel desired for various purposes.

The sheet industry is not unique but it is quite typical of this tendency to make steel adapted to individual requirements. A countless number of descriptions of sheets are found in the trade, adapted to various uses, and in many instances one must go back one generation, to the steel mill, in order to produce the needed results. It has naturally followed that the sheet mills have been disposed to build steel mills to make their raw material. At the present moment two sheet-mill interests are thus building steel mills, and including them in the count 53 per cent. of the companies producing sheets make their steel themselves. In a few cases the sheet mills are an adjunct to a large steel plant; in the majority of instances, however, the concern is primarily a producer of sheets, the manufacture of steel being an adjunct, and undertaken not directly for profit but in order that the manufacture of profitable specialties can be conducted.

Molding-Machine Sales Methods

Foundrymen may roughly be classified as progressive and non-progressive. The progressives are those who, recognizing improved methods and equipment, adopt the former and install the latter, following such adoption or installation with a backing that will ultimately mean success. The non-progressives are hide-bound. They may lack ambition to improve, using time-worn excuses. They may be influenced by labor conditions, particularly the jobbing foundry class, which fact is admitted only in the most confidential way. This non-progressive type, even though capable of recognizing improved methods and equipment, will not turn a hand in self-help and if one tries to educate, it is necessary to show the way in their own shops under almost impossible conditions, with about a 50 per cent. chance of securing adoption of methods or equipment even though a perfect demonstration is made. All this must be undertaken without the slightest help from the works organization and usually with the greatest of hindrance or opposition from the men.

In the earlier stages of the manufacture of any commodity it is generally necessary to introduce and show the utility of the article by a certain amount of missionary work, until at least it is demonstrated that the product is worthy of adoption and good for the trade. After a generous amount of this missionary work is done, and the article is well established, the manufacturers do away with trial sales, demonstrations, etc., and sales are contracted on the same basis as for any other standard commodity.

The manufacturers of molding machines have for years been spending large amounts of money in educating foundrymen. This is still being done at the yearly conventions held in various sections of the country, where the latest types of equipment are shown and operated. It is being done also by selling this equipment with an agreement to demonstrate on the foundryman's work in his own shop, showing him how, and in many instances mounting his patterns; in short, taking all the chances of failure without the slightest responsibility on the part of the purchaser.

Although molding machines have been manufactured and sold commercially since 1895, have become standardized into well-known types, and much money has been spent in missionary work, the conditions have not improved as far as the manufacturer is concerned, and the selling practices are as objectionable today as they were some six or seven years back if not more so. This can be blamed in part on the non-progressive foundrymen, but most of the blame is to be laid at the door of the manufacturers themselves in their eagerness to make sales in competition with other makers, whose number has grown in undue proportion to the available volume of business to be had. Such a condition means a very high cost of selling, and this cost must be borne by the manufacturer, coming out of his profits, or it must be borne by the purchaser. Inasmuch as the manufacturers, having spent so much money in missionary work, demonstrations, trial orders, etc., are still doing business, it is obvious that they have not been carrying the entire burden. Only one conclusion remains, namely, that the purchaser has been paying for his own education or at least partially so, which is a condition that is just and proper when educational effort is needed. It was proper a half dozen or more years ago, but it is hardly just today, except in the case of new devices. It surely could not be considered either just or proper for the future.

Today there are many types of molding machines and devices in operation in all sections of the United States and Canada, in every kind of foundry, and on all classes of work; further than this, at the foundrymen's conventions demonstrations are made of all machines and devices that are manufactured. Any foundryman, therefore, can, with but a minimum expenditure of effort and money, easily investigate and to his own satisfaction determine whether molding machines are adaptable to his work. He can do this personally by going to the shops of his contemporaries who will, with hardly an exception, open their doors and show everything they have. Ofttimes a few letters written to foundrymen doing a similar line of work will bring the desired information or at least enough to enable a foundryman to proceed with the installation of machines. Any molding-machine manufacturer will undoubtedly be pleased to give first-hand advice as to the adoption of machines on any line of work and at the same time furnish lists of users of molding machines on similar lines of castings.

With all this fund of information at the foundryman's command, it is no longer necessary, with but

few exceptions, for him to pay for equipment long prices that include demonstrations, heavy costs incident to trial orders and charges that must be considered in selling when guarantees are made by manufacturers. When a manufacturer guarantees to do something in the purchaser's foundry, he knows there are many adverse conditions to meet and overcome and that such work takes time and is expensive. But while it is in the non-progressive shop that these selling methods are necessary the cost must be charged to general sales expense and must be distributed over the price of all machines. Thus the burden is carried by the progressive foundryman who helps to pay the way for the laggard non-progressive. This is a deplorably unfair and intolerable condition.

The time has arrived for molding machine manufacturers, whether they see it or not, to figure their selling price on a fair percentage above shop costs—just as manufacturers of all other established lines do—and not make the progressive and competent foundryman suffer for the lack of ability of the non-progressive type. This would mean a material reduction in prices paid for molding-machine equipment and would throw the burden on the non-progressive foundryman, where it belongs; for if the latter needed or desired demonstrations or feared to purchase except on trial, or insisted on guarantees, he would have to pay for such privileges and should pay for them liberally.

The Future Machinery Market

Many signs indicate a great latent demand for metal-working machinery of all descriptions. Very significant is the fact that the machine-tool manufacturers, who have been hit as hard as any one by the depression, are receiving numerous inquiries which may be classed as tentative. Their tenor is: "How soon could you make deliveries of such and such machinery should business get good?" With these letters are mingled not a few requests for details as to machines, but containing no statement as to why the information is desired.

The volume of this suggested business is large, yet these inquiries are merely the surface indications of what will be exposed as soon as general confidence is restored. Even exclusive of the railroad requirement, which will be heavy when the companies are in a position to modernize and enlarge their repair shops, the demand promises to be sufficient to place the trade on a prosperous basis.

To analyze the situation a little more in detail, the machine-tool industry is operating on a basis of production variously estimated in different localities at from 40 to 70 per cent. of full capacity. Some stocks are being accumulated, but not in a large way. Current American orders are augmented in material volume by foreign business which has revived to some extent in the past few months. Consequently shipments from the factories are not insignificant. A fair improvement in the demand would wipe out stocks in quick time, including second-hand machinery, a good deal of which is available, especially from the storehouses of the dealers.

Taking industry as a whole, conditions are no worse and in the opinion of many observers they are gradually improving, even in the face of the vacation season. If the latter statement is correct, and if the surface indications in the machinery trade, already mentioned, are to be trusted, the machine shops should be running on a much higher percentage of production, at the same time eliminating their accumulated stocks, earlier than the less hopeful manufacturers and dealers can be made to believe. Many men in the trade cannot see how good business can be deferred much longer. They believe that a little confidence will change the aspect of affairs in a large way.

The Iron Age Index

The index to Volume 93 of *The Iron Age*, January 1 to June 30, 1914, has been compiled and printed and will be mailed to subscribers applying for it. A list of those who have received the index heretofore is kept in this office and to all such the latest will be mailed without notice from them. Additional names will be put on this list on request.

SOUTHERN PIG-IRON RATES

Interstate Commission Orders Railroads to Reduce Rates to Northern Points

WASHINGTON, D. C., July 7, 1914.—The Interstate Commerce Commission has handed down its decision in the case of the Sloss-Sheffield Steel & Iron Company et al., vs. the Louisville & Nashville Railroad Company et al., in which it is held that the rates now charged on pig iron from the Birmingham district to Cincinnati, Louisville, St. Louis, Chicago, Boston, etc., are unreasonable and should be reduced to certain rates specified in the decision, equivalent to a cut of approximately 35c. per ton. The case has attracted much attention and has been pending before the Commission since February, 1913. The chief points of the decision are as follows:

"Certain operators of blast furnaces in Alabama and Tennessee complain that the existing rates on pig iron from the South to Ohio River crossings and to points north and east thereof, all-rail, and to New England, all-rail and rail-and-water, are unreasonable and unjustly discriminatory. The averment of unjust discrimination may be said to be predicated primarily upon a comparison of the Southern pig-iron rates with the rates on other commodities and on pig iron in other sections.

"Foundries and other users of Southern pig iron, located in the North, East, and West, intervened in behalf of complainants, while furnace operators in Ohio, Illinois, Wisconsin, Pennsylvania, and Minnesota intervened to procure a continuance of the present rates.

"About 1881, after a conference between the railroads and the furnace operators, a schedule of rates based upon the market price of pig iron was agreed upon and adopted. Under this schedule a rate of $2.50 from Chattanooga to Louisville was established based upon a price of $15 per ton on No. 1 mill iron at Chattanooga. This made the Birmingham to Louisville rate $3.05. According to the agreement, the rates were to be advanced 15c. per ton with each increase of $1 in the selling price of pig iron until such price reached $20; 10c. per ton was to be added to the rate for each $1 increase above $20 in the selling price of pig iron.

"With the expiration of this agreement, in 1886, no formal undertaking was entered into, but the railroads, adhering, in substance, to the old agreement, published a rate of $2.50 from Birmingham to Louisville, based upon No. 1 mill iron worth $11.25 per ton or under. It was proposed to increase this rate by an amount equal to 25 per cent. of any increase in the price of iron. This arrangement continued until 1894, during all of which time the rates were supposed automatically to adjust themselves to the market price of iron. But

is that year the automatic-change feature was abandoned and specific rates were published, Louisville being given a rate of $2 per ton from Birmingham, with a proportional rate of $1.85. At that time No. 1 mill iron was worth about $7 per ton. The rates thereafter published likewise were made with relation to the selling price of pig iron and were revised at intervals to follow, as nearly as practicable, the market fluctuations.

"Since April, 1907, the rate has been fixed at $3 per ton regardless of the price at which pig iron might be selling, despite the fact that it was made effective at a time when pig iron had reached a record price, though before the close of that year Birmingham pig iron had declined to $14 per ton and up to January of this year had not gone beyond about $14.50.

"Complainants do not contend for rates that will vary with the pig-iron market, but insist that if the predication of freight rates upon the value of pig iron be discontinued, the rate in effect when iron was at its highest should not be taken as a reasonable charge for pig iron under all conditions. In this argument there is much force, for while we by no means advocate the making of freight rates with relation to the selling price of the commodity, at the same time when the carriers by their own action have established such a practice, it is but fair to assume that the rates charged during periods of unusual prosperity were sufficiently above the normal to make up any decrease in profits sustained during leaner years.

"A careful review of the entire situation convinces us that the rates now exacted are unreasonable and that reasonable rates from the Birmingham district should not exceed the following per gross ton: To Louisville, $2.65; to St. Louis, $3.40; to Chicago, $4; to Boston, rail-and-water, $4.25.

"The present differentials between the Southern furnaces should be maintained, as should also the relation of rates now obtaining to the Ohio River, to points to the central freight association territory, and to the East. No change will be ordered in the proportional rates to the Ohio River at this time for the reason that this would throw the entire reduction upon the Southern lines. The proportional rates to and from the Ohio River should be revised so as to make the through rate to Chicago, for example, not in excess of $4 per gross ton.

"To the interior New England points, however, we experienced more difficulty. These rates are made the full combination of the rates to and from the New England ports, plus handling charges, which to Springfield, Mass., for example, aggregate $6 per ton gross; to Lowell, Mass., $5.85, and to Portland, Me., $6. At Boston there is a transfer and handling charge of 40c. per ton from the boat to the car, while at Providence this charge appears to be but 10c. per ton because of different terminal conditions. . . . Our opinion is that the existing rates from Birmingham to the interior New England points mentioned are unreasonable and that reasonable rates should not exceed $5.25 to Springfield and Portland, and $5 to Lowell, with like reductions in the rates to other interior New England points.

"Although attacking the all-rail rates to New England in their petition, complainants manifested little interest in those charges and have not presented sufficient testimony upon which a definite finding with respect thereto can be made. As to the reasonableness of the present differentials between all rail and rail and water we express no opinion, but nothing herein said must be taken as a justification for any increase in such differentials. With this understanding, we will leave to the carriers the readjustment of their all-rail rates to New England points.

"Complainants have asked us to group all of the New England points at the port rates, but this we do not think fair. We have not sufficient data before us specifically to prescribe the individual rates to all of the New England points, but will expect the carriers to accomplish a readjustment in line with the views herein expressed.

"Reparation is prayed for, but under the circumstances of this case we do not believe that it may fairly be awarded." W. L. C.

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Foreign Trade Club Formed

To afford a meeting place for those interested in American foreign trade, India House, a down-town club, has been organized in New York City. The headquarters will be at 1 Hanover square, the old New York Cotton Exchange building, which is now being remodeled. The membership will be national in character, and it is planned to form European connections, so that in foreign cities members will have a place in which to feel "at home" and to entertain. The new club house is to be ready by November 15.

At a recent meeting James A. Farrell, president United States Steel Corporation, was elected president; J. P. Grace, president W. R. Grace & Co., treasurer; Willard Straight, J. P. Morgan & Co., secretary. Alba B. Johnson, president Baldwin Locomotive Works, Philadelphia; Edward N. Hurley, president Machine Company of Chicago, and James R. Morse, American Trading Company, were elected vice-presidents.

No. 1 blooming mill at the South works of the Illinois Steel Company made a new record in May for the average product per turn throughout the month, rolling an average of 840 tons as compared with the best previous record of 815 tons, made in October, 1912. This mill breaks down for the structural mill.

ONLY FOUR FURNACES LESS

Small Decline in Pig-Iron Output

Capacity in Blast on July 1 About 800 Tons Less Than on June 1

The country's June production of coke and anthracite pig iron shows a lower rate of decline than that of the preceding month, the falling off in the daily rate of production having decreased from 8159 tons in May to 3590 tons in June. The total for the month was 1,917,783 tons, or 63,916 tons per day, as compared with 2,092,686 tons, or 67,506 tons per day, in May. The rate of production in the past month is approximately 3100 tons above the very low point of January last and is about the same as that of December, 1913. The net loss in the number of active stacks is 4, there having been 193 furnaces in blast on July 1 and 197 on June 1. The capacity of the active furnaces on July 1 was 63,698 tons per day as compared with 64,514 tons a month previous, a decrease of 816 tons. The decline in the daily rate of production of the merchant furnaces was about 1½ per cent. less than that of the steel works furnaces.

DAILY RATE OF PRODUCTION

The daily rate of production of coke and anthracite pig iron by months, from June, 1913, is as follows:

Daily Rate of Pig-Iron Production by Months—Gross Tons

	Steel works	Merchant	Total
June, 1913	62,002	25,617	87,619
July	59,362	23,239	82,601
August	59,140	22,981	82,121
September	60,941	22,590	83,531
October	59,630	22,503	82,153
November	52,434	22,019	74,453
December	41,879	22,108	63,987
January, 1914	40,691	20,117	60,808
February	47,479	19,974	67,453
March	54,990	20,748	75,738
April	54,508	21,157	75,665
May	47,028	20,478	67,506
June	44,321	19,595	63,916

OUTPUT BY DISTRICTS

The accompanying table gives the production of all coke and anthracite furnaces in June and the three months preceding:

Monthly Pig-Iron Production—Gross Tons

	Mar. (31 days)	Apr. (30 days)	May (31 days)	June (30 days)
New York	135,166	144,200	137,853	124,374
New Jersey	9,997	10,868	10,880	10,327
Lehigh Valley	77,616	75,072	65,500	63,640
Schuylkill Valley	49,207	68,436	69,770	64,392
Lower Susquehanna and Lebanon Valley	37,921	41,493	41,124	30,377
Pittsburgh district	570,648	529,371	461,660	424,530
Shenango Valley	141,469	125,756	90,414	67,915
Western Pennsylvania	117,171	113,979	121,145	115,420
Maryland, Virginia and Kentucky	60,305	61,694	64,223	59,218
Wheeling district	123,113	113,467	86,138	74,982
Mahoning Valley	229,923	241,254	222,207	207,693
Central and Northern Ohio	187,110	167,920	151,501	136,021
Hanging Rock and S. W. Ohio	33,414	34,058	35,361	31,746
Chicago district	317,603	305,718	301,696	286,644
Mich., Minn., Mo., Wis. and Col.	78,560	75,680	66,242	59,438
Alabama	159,883	142,985	151,203	144,521
Tennessee	18,761	18,004	15,769	16,435
Total	2,347,867	2,269,955	2,092,686	1,917,783

PRODUCTION OF STEEL COMPANIES

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel-making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Pig, total production			Spiegeleisen, ferromanganese, etc.		
	1912	1913	1914	1912	1913	1914
Jan.	1,483,153	1,981,560	1,261,430	22,622	15,633	17,325
Feb.	1,550,995	1,792,154	1,329,414	15,950	20,131	10,524
Mar.	1,827,792	1,904,878	1,704,688	11,538	20,546	20,133
Apr.	1,830,717	1,939,751	1,635,226	11,104	23,108	18,676
May	1,922,537	1,991,192	1,457,847	20,518	19,042	21,504
June	1,823,958	1,860,070	1,329,623	26,685	19,212	16,254
July	1,803,205	1,840,216	.....	26,522	22,310	.....
Aug.	1,843,404	1,833,352	.....	24,225	20,680	.....
Sept.	1,773,073	1,828,232	.....	22,484	24,555	.....
Oct.	1,947,426	1,848,634	.....	27,252	19,499	.....
Nov.	1,884,524	1,573,007	.....	17,461	26,765	.....
Dec.	1,976,870	1,298,262	.....	18,523	14,095	.....

CAPACITY IN BLAST JULY 1 AND JUNE 1

The following table shows the daily capacity, in gross tons, of furnaces in blast July 1 and June 1, by districts:

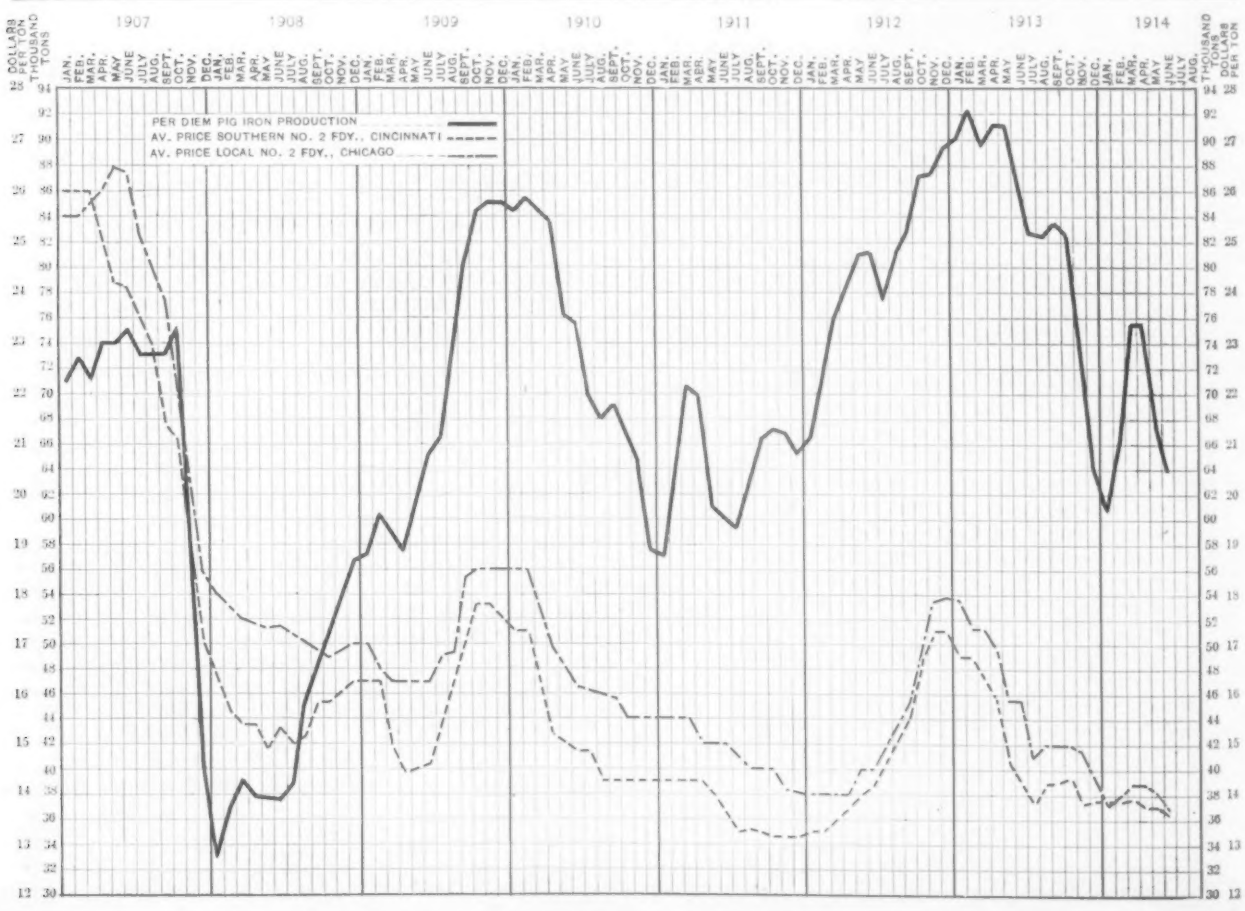

Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to July 1, 1914; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

Coke and Anthracite Furnaces in Blast

Location of furnaces	Total number of stacks	July 1 Number in blast	July 1 Capacity per day	June 1 Number in blast	June 1 Capacity per day
New York:					
Buffalo	19	10	3,581	10	3,675
Other New York	7	3	565	3	595
New Jersey	7	2	344	2	351
Pennsylvania:					
Lehigh Valley	22	7	1,986	7	1,975
Spiegel	2	1	78	2	172
Schuylkill Valley	16	8	2,198	8	2,251
Lower Susquehanna	7	2	479	2	485
Lebanon Valley	10	3	533	4	643
Pittsburgh district	52	31	13,824	31	13,315
Spiegel	4	2	329	2	367
Shenango Valley	19	7	2,180	8	2,435
West'n Pennsylvania	27	13	3,882	14	4,195
Maryland	4	2	882	2	875
Wheeling district	14	7	2,499	7	2,662
Ohio:					
Mahoning Valley	25	17	6,967	17	6,985
Central and Northern	24	13	4,534	11	4,310
Hang'g R'k & S. W. Ohio	15	7	1,012	8	1,085
Illinois and Indiana	34	20	9,515	20	9,526
Spiegel	2	0	0	1	115
Mich., Wis. and Minn.	10	5	1,242	5	1,308
Colorado and Missouri	8	2	740	2	701
The South:					
Virginia	24	7	833	7	872
Kentucky	5	1	130	2	325
Alabama	46	18	4,817	18	4,878
Tennessee	20	5	548	4	509
Total	423	193	63,698	197	64,514

The furnaces which were blown out in June include the B stack of the Tonawanda Iron & Steel Company (Niagara) in the Buffalo district, No. 1 Palmerton in the Lehigh Valley, one Bird Coleman in the Lebanon Valley, Atlantic in the Shenango Valley, No. 3 Cambria and Earlston in western Pennsylvania, Norton in Kentucky, Jisco in the Hanging Rock district and South furnace No. 1 in the Chicago district.

Five furnaces were blown in—Niagara A in the Buffalo district, Scottdale in western Pennsylvania, one Central and one Toledo in northern Ohio and Johnson City in Tennessee.

DIAGRAM OF PIG-IRON PRODUCTION AND PRICES

The fluctuations in pig-iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of *The Iron Age*. The figures for daily average production are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907—Gross Tons

	1907	1908	1909	1910	1911	1912	1913	1914
Jan.	71,149	33,918	57,975	84,148	56,752	66,384	90,172	60,808
Feb.	73,038	37,163	60,976	85,616	64,090	72,442	92,369	67,453
Mar.	71,821	39,619	59,232	84,459	70,036	77,591	89,147	75,738
Apr.	73,885	38,289	57,962	82,792	68,836	79,181	91,759	75,665
May	74,048	37,603	60,753	77,102	61,079	81,051	91,039	67,506
June	74,486	36,444	64,656	75,516	59,585	81,358	87,619	63,916
July	72,763	39,287	67,793	69,305	57,841	77,738	82,601	.....
Aug.	72,594	42,851	72,546	67,963	62,150	81,046	82,057	.....
Sept.	72,783	47,300	79,507	68,476	65,903	82,128	83,531	.....
Oct.	75,386	50,554	83,856	67,520	67,811	86,722	82,133	.....
Nov.	60,937	51,595	84,917	63,659	66,648	87,697	74,453	.....
Dec.	39,815	56,158	85,022	57,349	65,912	89,766	63,987	.....

THE RECORD OF PRODUCTION

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1910—Gross Tons

	1910	1911	1912	1913	1914
Jan.	2,608,605	1,759,326	2,057,911	2,795,331	1,885,054
Feb.	2,397,254	1,794,509	2,100,815	2,586,337	1,888,670
Mar.	2,617,949	2,171,111	2,405,318	2,763,563	2,347,867
Apr.	2,483,763	2,064,086	2,375,436	2,752,761	2,269,955
May	2,390,180	1,893,456	2,512,582	2,822,217	2,092,686
June	2,265,478	1,787,566	2,440,745	2,628,565	1,917,783
July	2,148,442	1,793,068	2,410,889	2,560,646	.....
Aug.	2,106,847	1,926,637	2,512,431	2,545,763	.....
Sept.	2,056,275	1,997,102	2,463,839	2,505,927	.....
Oct.	2,093,121	2,102,147	2,689,933	2,546,261	.....
Nov.	1,909,780	1,999,433	2,630,854	2,233,123	.....
Dec.	1,777,817	2,043,270	2,782,737	1,983,607	.....

The Blaw Steel Construction Company, Pittsburgh, Pa., announces the appointment of Alan P. Wilson as Western sales manager, with headquarters in the People's Gas Building, Chicago, and Harry S. Beale as Eastern sales manager, with headquarters at 165 Broadway, New York City.

Blast Furnace Notes

Furnace B of the Detroit Iron & Steel Company, Detroit, Mich., which is out of blast for relining, will be made into a thin-lined furnace. The A stack of this company was provided with a thin lining some time ago. Arthur G. McKee, contracting engineer, Cleveland, Ohio, has the contract for relining the furnace and has awarded the contract for the steel work to the William B. Pollock Company, Youngstown, Ohio.

The Delaware River furnace was blown in June 11 after having been out for repairs for 10 days.

The furnaces of the Republic Iron & Steel Company in the Shenango Valley are both idle, Atlantic having been blown out in the past month while Hall became inactive in April.

On July 1, the Cambria Steel Company had six furnaces in blast as compared with seven on June 1. Two furnaces, Nos. 2 and 3, are being rebuilt.

Jisco furnace was blown out on June 23 for repairs.

South furnace No. 1 of the Illinois Steel Company was banked for 10 days from June 13 to 23 and was blown out June 26. This was the only stack to go out of blast last month in the Chicago district.

The only changes that took place in the Buffalo district in the past month were the blowing out of one Niagara stack and the blowing in of another on June 10.

In the Pittsburgh district 33 furnaces were active on July 1, there having been no changes in June. The Midland furnace of the Pittsburgh Crucible Steel Company, which was blown out April 29, is being relined.

Oriskany furnace was blown in on June 16 after having been banked 16 days.

Effect of Southern Rate Decision at Chicago

CHICAGO, ILL., July 8, 1914.—(*By Telegraph.*)—Interest in the announcement of a reduction in the pig-iron rate from Birmingham to Chicago centers as much about the probability of melters holding up shipments until the date that the new rate becomes effective as it does upon the possibility of an increased proportion of pig-iron purchases being placed in the South. It is the impression that there may be a general holding up of shipment of Southern iron, which will be combated by the furnaces with the contention that all purchases contracted for delivery prior to the effective date of the new rate must bear the higher tariff and that this cannot be evaded by arbitrarily delaying shipment.

A considerable proportion of Southern iron sold since the agitation for a lower rate has been on a basis giving to the purchaser the benefit of any reduction that might be made. In the present condition of the market it seems probable that the furnaces will absorb the entire reduction on new sales. This will make Southern iron competitive with local iron in Chicago at approximately an even basis at the present time.

The Western Malleables Company, Beaver Dam, Wis., composed of the purchasers of the assets of the defunct Beaver Dam Malleable Iron Company, is perfecting its organization, and the four plants are gradually resuming operations, although full time is not in immediate prospect by reason of the conservatism of railroad buying. The company's specialty is railroad malleable work, tie plates, etc. The new company is capitalized at $400,000 and the directors just elected are Lawrence Fitch, Ernest E. Smythe and M. A. Jacobs. Mr. Fitch was vice-president of the old concern and Mr. Smythe has been in charge of the works for the trustee and receiver since the voluntary petition in bankruptcy was filed last September. Officers will be elected late this week.

The Nordberg Mfg. Company, Milwaukee, Wis., is preparing for the delivery of 10 large pumping engines for the sewage and water commission of New Orleans. The delivery is made extremely difficult because of the bulk, and disassembling has been carried further than usual because of objections of the railroads to this bulk.

S. DIESCHER & SONS.
Mechanical and Civil Engineers,
PITTSBURGH, PA.

The Iron and Metal Markets

THE CORNER TURNED

Well-Defined Improvement Seen

Mills Shorten Their Mid-Year Shutdowns

Indications of improvement in the steel trade are notably increasing. The corner seems to have been turned at last and manufacturers are now confident that the remainder of the year will show a much larger volume of business than the first half. The United States Steel Corporation reports its bookings of new orders in June larger than for any previous month this year. It would not be surprising if an increase should be shown in the statement of unfilled orders which will come out in a day or two.

A most significant fact in this connection is that not only the mills of the United States Steel Corporation, but also those of numerous independent steel manufacturers have shortened their mid-year shutdowns for inventories and repairs. It had been expected that the great majority of these mills would be closed for at least two weeks and some for a longer time. Instead of doing this, practically all have started again this week.

It is believed that nearly all of the large agricultural implement manufacturers have placed contracts for steel bars for at least the coming six months. The leading implement interest is stated to have not yet bought. In a few instances some contracts covered the full twelvemonth from July to July, but those placed for the first six months of next year were at $1 per ton advance.

Not only is the demand for finished steel products better, but indications are seen of strengthening in price. Few manufacturers are willing to book long contracts at present figures and intimations are being made of some advance. Probably wire products may be the first to be advanced as the demand has increased decidedly within the past few days.

The large impetus to a better feeling which the steel rail orders of the week have given needs only the following partial enumeration for substantiation: Though discounted to a greater or less degree, the clearing of the atmosphere of uncertainty regarding the Pennsylvania's rail distribution has helped materially. Of the 100,000 tons placed, 75,000 tons are for 100-lb. rails and the remainder 120-lb. rails. The Steel Corporation will roll 44,000 tons; the Pennsylvania and Cambria steel companies each 22,000 tons; and the Bethlehem and Lackawanna steel companies each 6000 tons; and all companies will roll both sections. The Missouri Pacific has bought 6700 tons of rails of the Tennessee Coal, Iron & Railroad Company; the Pennsylvania Steel Company has taken an order for 2500 tons for a Southern line and two orders for girder rails amounting to 1250 tons. A small Western road has bought 1000 tons from the Illinois Steel Company and the Nitrate Railways, Chile, has bought 2500 tons. The Boston & Maine has placed 4250 tons with the Bethlehem Steel Company and 1500 tons with the Lackawanna Steel Company.

While the demand for pig iron is improving, this branch of trade is not showing the same strength as finished steel products. Production is at a minimum. However, a cessation in the three months declining pig-iron production is indicated in our general statistics.

The competition of Southern pig iron in Northern markets has been strengthened by the Interstate Commerce Commission's decision ordering the railroads to reduce their rates from Alabama to Northern points at least 35 cents per ton. It will take several days to develop the full effect of this decision on pig-iron prices.

With nearly 9000 cars actively before the market, and rumors of more soon to come, attention is further directed to the possibility of better early railroad purchasing. The drawback from the car-builders' standpoint is the low prices obtaining.

Much relief is afforded in the news that the union sheet and tin-plate mills have agreed with the Amalgamated Asociation on what is virtually a renewal of the old scale of wage payments.

Demand for structural material is keeping up well, particularly for the season.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

	July 8, 1914.	July 1, 1914.	June 10, 1914.	July 9, 1913.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia....	$14.75	$14.75	$14.75	$15.75
No. 2, Valley furnace...	13.00	13.00	13.00	14.00
No. 2 Southern, Cin'ti...	*13.25*	13.50	13.75	13.75
No. 2, Birmingham, Ala.	*10.00*	10.25	10.50	10.50
No. 2, furnace, Chicago*	13.75	13.75	13.50	14.75
Basic, del'd eastern Pa.	14.00	14.00	14.00	15.50
Basic, Valley furnace....	13.00	13.00	13.00	14.50
Bessemer, Pittsburgh....	14.90	14.90	14.90	16.90
Malleable Bess., Ch'go*	14.00	14.00	13.75	14.50
Gray forge, Pittsburgh..	13.65	13.65	13.65	14.65
L. S. charcoal, Chicago.	15.75	15.75	15.75	15.75
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh.	19.00	19.00	19.50	26.50
O.-h. billets, Pittsburgh.	19.00	19.00	19.50	26.50
O.-h. sheet bars, P'gh...	20.00	20.00	20.50	27.00
Forging billets, base, P'gh.	25.00	25.00	25.00	34.00
O.-h. billets, Phila.....	21.90	21.90	22.40	28.00
Wire rods, Pittsburgh...	24.50	24.50	24.50	28.50
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	12.25	12.25	12.75	14.00
Iron rails, Philadelphia.	15.00	15.00	15.00	17.50
Carwheels, Chicago....	11.25	11.25	11.50	13.00
Carwheels, Philadelphia.	11.00	11.00	11.25	13.00
Heavy steel scrap, P'gh.	11.50	11.50	11.50	12.50
Heavy steel scrap, Phila.	10.50	10.50	10.50	11.50
Heavy steel scrap, Ch'go	9.75	9.75	9.75	10.50
No. 1 cast, Pittsburgh...	11.50	11.50	11.50	12.75
No. 1 cast, Philadelphia.	12.00	12.00	12.00	13.00
No. 1 cast, Ch'go (net ton).	9.75	9.75	9.75	10.75
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia..	1.17½	1.17½	1.17	1.47½
Iron bars, Pittsburgh...	1.25	1.25	1.25	1.65
Iron bars, Chicago.....	1.00	1.00	1.10	1.50
Steel bars, Pittsburgh...	1.10	1.10	1.12½	1.40
Steel bars, New York...	1.26	1.26	1.28½	1.56
Tank plates, Pittsburgh.	1.10	1.10	1.10	1.45
Tank plates, New York..	1.26	1.26	1.26	1.61
Beams, etc., Pittsburgh.	1.10	1.10	1.12½	1.45
Beams, etc., New York..	1.26	1.26	1.28½	1.61
Skelp, grooved steel, P'gh	1.15	1.15	1.15	1.45
Skelp, sheared steel, P'gh	1.20	1.20	1.20	1.50
Steel hoops, Pittsburgh..	1.25	1.25	1.25	1.60
Sheets, Nails and Wire,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	1.80	1.80	1.80	2.25
Galv. sheets, No. 28, P'gh	2.75	2.75	2.75	3.35
Wire nails, Pittsburgh..	1.50	1.50	1.50	1.70
Cut nails, Pittsburgh...	1.55	1.55	1.55	1.70
Fence wire, base, P'gh..	1.30	1.30	1.30	1.55
Barb wire, galv., P'gh...	1.90	1.90	1.90	2.20

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, **Connellsville,**

Per Net Ton at Oven:	July 8, 1914.	July 1, 1914.	June 10, 1914.	July 9, 1913.
Furnace coke, prompt..	$1.75	$1.75	$1.75	$2.50
Furnace coke, future....	1.85	1.85	1.85	2.50
Foundry coke, prompt..	2.30	2.30	2.30	2.75
Foundry coke, future....	2.40	2.50	2.50	3.00

Metals.

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	**14.00**	13.87½	14.12½	14.75
Electrolytic copper, N. Y.	**13.75**	13.40	13.87½	14.50
Spelter, St. Louis.....	4.85	4.90	4.95	5.25
Spelter, New York.....	5.00	5.05	5.10	5.40
Lead, St. Louis.....	3.75	3.77½	3.80	4.20
Lead, New York.....	3.90	3.90	3.90	4.35
Tin, New York.....	**32.00**	30.45	30.65	39.35
Antimony, Hallett's, N. Y.	6.75	6.75	6.87½	8.00
Tin plate, 100-lb. box, P'gh	$3.30	$3.30	$3.30	$3.60

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.10c. to 1.15c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in....	.10
Gauges under 3-16 in. to and including No. 8....	.15
Gauges under No. 8 to and including No. 9....	.25
Gauges under No. 9 to and including No. 10...	.30
Gauges under No. 10 to and including No. 12..	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles 3 ft. in diameter and over.....	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft., inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.10c. to 1.15c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909....	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulk angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.30 to $1.35; galvanized, $1.70 to $1.75. Galvanized barb wire and fence staples to jobbers, $1.90 to $1.95; painted, $1.50 to $1.55. Wire nails to jobbers, $1.50 to $1.55. Woven wire fencing, 73½ per cent. off list for carloads; 72½ off for 1000-rod lots; 71½ off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.50	$1.55	$1.60	$1.65	$1.75	$1.85	$1.95	$2.05
Galvanized	1.95	1.95	2.00	2.05	2.15	2.25	2.65	2.75

Wire Rods.—Bessemer, open-hearth and chain rods, $24.50 to $25.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from April 20, 1914, and iron pipe from June 2, 1913, all full weight:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	73	52½	⅛ and ¼	66	47
½	77	66½	⅜	65	46
¾ to 3	80	71½	½	69	56
			¾ to 2½	72	61

Lap Weld

2	77	68½	1¼	56	45
2½ to 6	79	70½	1½	67	56
7 to 12	76	65½	2	68	58
13 to 15	53	..	2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted

1 to 3, butt	78	69½	1 to 1½, butt	70	59
2, lap	75	66½	2, butt	70	59
2½ to 6, lap	77	68½	1¼, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap	68	59

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	68	57½	⅜	63	52
½	73	66½	½	67	60
¾ to 1½	77	70½	¾ to 1½	71	62
2 to 3	78	71½	2 and 2½	72	63

Lap Weld, extra strong, plain ends

2	74	65½	1½	65	59
2½ to 4	76	67½	2	66	58
4½ to 6	75	66½	2½ to 4	70	61
7 to 8	68	57½	4½ to 6	69	60
9 to 12	63	52½	7 to 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends

½	63	56½	½	57	49
¾ to 1½	66	59½	¾ to 1½	60	52
2 to 2½	68	61½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends

2	64	57½	2	55	49
2½ to 4	66	59½	2½ to 4	60	54
4½ to 6	65	58½	4½ to 6	59	53
7 to 8	58	47½	7 to 8	52	42

To the large jobbing trade an additional 5 and 2½ per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1¾ and 2 in.	62	1½ in.	45
2¼ in.	59	1¾ and 2 in.	49
2½ to 2¾ in.	65	2¼ in.	47
3 and 3¼ in.	70	2½ to 2¾ in.	54
3½ to 4½ in.	72	3 and 3¼ in.	57
5 and 6 in.	65	3½ to 4½ in.	60
7 to 13 in.	62	5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.30
Nos. 9 to 10	1.35
Nos. 11 and 12	1.40
Nos. 13 and 14	1.45
Nos. 15 and 16	1.55

Box Annealed Sheets, Cold Rolled

Nos. 10 and 11	1.45 to 1.50
No. 12	1.45 to 1.50
Nos. 13 and 14	1.50 to 1.55
Nos. 15 and 16	1.55 to 1.60
Nos. 17 to 21	1.60 to 1.65
Nos. 22 and 24	1.65 to 1.70
Nos. 25 and 26	1.70 to 1.75
No. 27	1.75 to 1.80
No. 28	1.80 to 1.85
No. 29	1.85 to 1.90
No. 30	1.95 to 2.00

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	1.75 to 1.80
No. 12	1.85 to 1.90
Nos. 13 and 14	1.85 to 1.90
Nos. 15 and 16	2.00 to 2.05
Nos. 17 to 21	2.15 to 2.20
Nos. 22 and 24	2.30 to 2.35
Nos. 25 and 26	2.45 to 2.50
No. 27	2.60 to 2.65
No. 28	2.75 to 2.80
No. 29	2.90 to 2.95
No. 30	3.05 to 3.10

Pittsburgh

PITTSBURGH, PA., July 7, 1914.

Here and there the market appears to be a trifle quieter than a fortnight ago, but such quietness is attributed chiefly to the holiday, and in many quarters the flow of orders is reported to be as large as at any time since the market began to improve five or six weeks ago. The opinion is now very generally expressed that the second half of the year will prove decidedly better than the first half in point of tonnage, but it is admitted that conditions must become a great deal better than they are now before any material advance can occur in prices. Very little has been done in the direction of closing mills for repairs, and July production promises to be about as heavy as in June, thus making a much better showing for July than was expected six weeks ago. At a conference which started last Thursday night and lasted until Friday night, the union sheet and tin-plate mills agreed with the Amalgamated Association on a virtual renewal of the old scale, and the scale was signed in the conference for nearly all the union mills, there being an Eastern mill which will act independently, while three interests—Brier Hill Steel Company, Whitaker-Glessner Company and Trumbull Steel Company—had previously signed as they desired to keep in operation. The other mills affected closed Saturday, June 27, and have been engaged in making repairs. Some of them have started this week, while most of the remainder will start next Monday. The majority of the sheet and tin-plate mills are non-union and ran straight through. There is a growing tendency among buyers of finished steel to contract for third quarter or second half, provided contracts could be closed at the same prices as now prevail for prompt shipment. In most cases the mills refuse to name such prices and thus the volume of contracting is not very heavy. Prices for prompt shipment have shown practically no decline for three or four weeks and the opinion is growing that the present level marks the bottom.

Pig Iron.—Bessemer iron continues quiet, but occasional sales are made of small lots and there seems to be no difficulty in securing $14, Valley, the regular quotation. A sale of 1000 tons is reported at this figure. It is learned that the recent sale of 35,000 tons of off basic by a Valley interest to the Wheeling Mold & Foundry Company involves an analysis with phosphorus not exceeding 0.50 and sulphur not exceeding 0.05, while the silicon may run up to 2.50 per cent. This tonnage was included in the 65,000 tons of basic grade mentioned last week as having been sold by one interest. Another sale was 10,000 tons of straight basic for delivery during August, September and October to the Alliance and Sharon plants, half and half, of the American Steel Foundries. This iron averaged fully $13 at Valley furnaces. Sellers of Bessemer and basic have assumed the attitude that recent sales represent the minimum and that in the near future there ought to be an advance. There is moderate buying of small lots of foundry iron at $13, Valley. M. A. Hanna & Co. have blown out their Cherry Valley furnace at Leetonia, Ohio, as they were unwilling to cut the price they had been asking for No. 2 foundry, $13.50 at furnace. The Shenango Furnace Company has almost completed rebuilding its No. 1 stack at Sharpsville and the furnace may be blown in late this month. It will have a capacity of about 450 tons a day, against 325 tons formerly. The company's Nos. 3 and 4 stacks are in blast. We quote: Bessemer, $14; basic, malleable and No. 2 foundry, $13; gray forge, $12.75, all at Valley furnaces, with 90c. freight to Pittsburgh, but would note that one or two furnaces having a 75c. freight rate to Pittsburgh have sold No. 2 foundry at $13 at furnace.

Billets and Sheet Bars.—There has been only a very moderate amount of contracting for unfinished steel for third quarter, as some consumers still have a good bit of steel under cover and others are far from keen about closing. We quote Bessemer and open-hearth billets at $19 to $19.50 and Bessemer and open-hearth sheet bars at $20 to $20.50, f.o.b. maker's mill, Pittsburgh or Youngstown. We quote forging billets at $25 for desirable orders of one size and up to but not including 10 x 10 in., regular extras being charged for larger sizes. On carload orders forging billets are held at $25. We quote axle billets at $23 for desirable orders and $24 for small lots, f.o.b. Pittsburgh.

Ferroalloys.—The great bulk of the prospective consumption of ferroalloys for the balance of the year is already under contract, and the market is very quiet. While the regular quotation on ferromanganese is $38, Baltimore, there are occasional sales of carloads at 50c. less. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $73; over 100 tons to 600 tons, $72; over 600 tons, $71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is $19; 11 per cent., $20, and 12 per cent., $21, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegeleisen at $25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Muck Bar.—Best grades of local muck bar are quotable at $27, f.o.b. Pittsburgh, but no sales have been made lately. The Amalgamated Association has organized a lodge among employees of the Pittsburgh Forge & Iron Company, which formerly dealt with the Sons of Vulcan, an organization which seems to be practically defunct. A conference is scheduled to be held in Chicago to-morrow between the Western Bar Iron Association and the Amalgamated Association, at which a wage scale for the year may possibly be arranged. Meanwhile a number of the iron mills are closed.

Structural Material.—A very satisfactory run of small structural jobs is reported, but nothing large has been closed in the past week. Excavation is being started this week for the new William Penn Hotel and the work is to be prosecuted 24 hr. a day so that the job will be ready for the structural steel in the fall. As already reported, the American Bridge Company has this contract. John F. Casey, who has the contract for the Cleveland filtration plant, has placed 1400 tons of sheet piling with the Carnegie Steel Company. We quote beams and channels, 15-in. and under, at 1.10c. for desirable orders and prompt shipment and 1.12½c. to 1.15c. for smaller orders, f.o.b. Pittsburgh.

Plates.—There has been a good run of plate tonnage placed with the mills, following the fairly heavy buying of cars, a total of 15,000 freight cars having been placed in June. No important car orders have been reported in the past week, but there are several live inquiries, including one for 1500 cars from the Wabash, and a still larger inquiry from a Western road. The Jas. McNeil & Bro. Company has ordered 300 tons of plates for riveted pipe work for the city of Pittsburgh. On orders at all desirable, for prompt shipment, the mills are quoting 1.10c. quite uniformly, while small lots bring 1.12½c. to 1.15c., f.o.b. Pittsburgh.

Steel Rails.—Formal allotments of the Pennsylvania system's rail order are expected to be given out in a few days, bids having been required to be in the hands of the purchasing agent yesterday. The rumored allotment is 44,000 tons for the Steel Corporation, 22,000 tons each for the Pennsylvania and Cambria companies, and 6000 tons each for Lackawanna and Bethlehem, making a total of 100,000 tons. We quote light rails rolled from billets as follows: 25, 30, 35, 40 and 45 lb. sections, 1.10c.; 16 and 20 lb., 1.15c.; 12 and 14 lb., 1.20c., and 8 and 10 lb., 1.25c., in carload lots, f.o.b. Pittsburgh. For large lots these prices might be shaded.

Steel Wheels.—The market for steel wheels has not been active, as demand is confined almost wholly to engine and passenger train carwheels. The freight cars now being built are usually with iron wheels as the railroads desire to keep down the investment. We quote 33-in. engine truck wheels at $21; 36-in. engine truck wheels, $22; 33-in. tender wheels, $17; 36-in. passenger and tender wheels, $19 to $19.50; 33-in. freight car wheels, $14.50 to $15, f.o.b. Pittsburgh.

Skelp.—There is a moderate amount of skelp buying in small lots, no large orders being put through. We quote: Grooved steel skelp, 1.15c. to 1.20c.; sheared steel skelp, 1.20c. to 1.25c.; grooved iron skelp, 1.50c. to 1.55c.; sheared iron skelp, 1.60c. to 1.65c., delivered to consumers' mills in the Pittsburgh district.

Wire Rods.—Consumers are rather slow in placing specifications against their rod contracts, and new buying is very small. We quote Bessemer, open-hearth and chain rods at $24.50 to $25, f.o.b. maker's mill, Pittsburgh, prices depending on desirability of the order.

Iron and Steel Bars.—Demand for steel bars from the implement interests continues disappointing, and when negotiations do start they generally wind up in a disagreement, the implement makers desiring to contract, if at all, for the whole twelvemonth, while the mills wish to limit the contracts to six months. A few bar contracts are understood to have been closed for third quarter at 1.10c. Orders for steel bars for prompt shipment are fairly good, and if anything make a heavier volume than two or three weeks ago. Iron bars continue quiet as the railroads are doing relatively little work. We quote steel bars at 1.10c. for desirable orders and prompt shipment, and 1.12½c. to 1.15c. for third quarter delivery. We quote iron bars, made nearly entirely from muck bar, at 1.25c. f.o.b. maker's mill, Pittsburgh. Regular extras for twisting reinforcing steel bars over the base price are as follows: ¾-in. and over $1; ½ to 11/16-in., $1.50; under ½ in., $2.50 per net ton. These extras are not always observed.

Hoops, Bands and Cotton Ties.—Bands are quoted at 1.10c., the same as merchant steel bars. Demand for hoops is reported as quite light. The mills are trying to adhere to 1.25c. as minimum for hoops, but it is reported that one or two sellers have named 1.20c. on desirable contracts. One or two of the mills which usually roll a quota of cotton ties have done nothing in this direction, prices obtainable being altogether unsatisfactory. The regular price of 65c. a bundle (45 lb.) figures out about 1.45c. per lb., whereas 15 and 16 gauge hoops, from which cotton ties are made, carry an extra of 30c. per 100 lb., so that with hoops at 1.25c. base the corresponding net price would be 1.55c.

Sheets.—The sheet mills as a whole are running decidedly lighter than a fortnight ago. Some of the independent plants are closed entirely, for repairs, while the leading interest will only average about 60 per cent. of full production this week. Occasionally contracts for forward delivery are made at very considerable advances over the prompt market, but as a rule the buying is only for delivery during the next 30 to 60 days, at the same prices as have ruled for two or three weeks past. We quote Nos. 9 and 10 blue annealed sheets at 1.35c.; No. 28 Bessemer black, 1.80c. to 1.85c.; No. 28 galvanized, 2.75c. to 2.80c.; No. 28 black plate, tin mill sizes, H. R. and A., 1.85c.; Nos. 29 and 30, 1.90c. The above prices are in carload lots, f.o.b. Pittsburgh, jobbers charging the usual advances for small lots from store.

Tin Plate.—Two or three of the independent tinplate mills have greatly reduced operations in the past two or three weeks, but the majority of the independents are running as fully as ever. The leading interest has only slightly reduced its operations, by closing some plants a few turns before the end of the week, and this week its output will be close to 90 per cent. of full capacity, which is regarded as a good showing for this month. We quote 100-lb. 14 x 20 coke plates as $3.30 to $3.40 and 100-lb. 14 x 20 terne plates at $3.20 to $3.30, f.o.b. Pittsburgh.

Shafting.—Demand continues relatively light and the market is quite irregular. On desirable orders 66 to 67 per cent. off the list is being done regularly, approximately the lowest price on record, while small lots go at 63 to 64 per cent. off, delivered in base territory.

Spikes.—The market for railroad spikes continues very dull, and $1.40 is as much as can be obtained for this general territory, while to meet the competition of Western mills in their territory a still lower Pittsburgh price would have to be named. We quote standard sizes of railroad and boat spikes at $1.40 and small railroad and boat spikes at $1.50 per 100 lb. in carload lots, f.o.b. Pittsburgh.

Merchant Steel.—There is a fair run of specifications against contracts for such grades of steel as are in season, with a moderate amount of new buying in small lots. On the whole the trade is very slack and prices are rather irregular. On small lots for prompt shipment we quote: Iron finished tire, ½ x 1½ in. and larger, 1.30c., base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ⅞ and 1 in., 1.80c. to 1.90c.; 1⅛ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

Wire Products.—This is the depth of the dull season in wire products, and no improvement would normally come until about August 1, when the Southern demand begins to open up. The mills insist that stocks in jobbers' and retailers' hands are extremely small, and expect a very good demand when the season opens up. It is stated that no contracts would be booked at the present low prices. While smooth fence wire is quoted at 1.30c., it is stated that wire for manufacturing purposes would not be sold at less than 1.35c., on account of the stricter requirements involved. We quote wire nails, $1.50 to $1.55; plain annealed wire, $1.30 to $1.35; galvanized barb wire and fence staples, $1.90 to $1.95; painted barb wire, $1.50 to $1.55, all f.o.b. Pittsburgh, actual freight added to point of delivery, terms, 30 days net, less 2 per cent. off for cash in 10 days. We quote steel cut nails at $1.55 to $1.60 f.o.b. Pittsburgh.

Nuts, Bolts and Rivets.—Nearly all the large buyers are now under contract for nuts and bolts for third quarter or last half, producers having made very attractive prices, and specifications are fairly good against contracts. Rivets are also experiencing a better demand. We quote button-head structural rivets in carload lots at 1.50c., and in small lots at 1.60c.; cone-head boiler rivets, 1.60c. in carload lots, and 1.65c. in small lots, with terms 30 days net, 2 per cent. for cash in 10 days. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 5% off
Small carriage bolts, cut threads	80% off
Small carriage bolts, rolled threads	80 and 5% off
Large carriage bolts	75 and 5% off
Small machine bolts, cut threads	80 and 5% off
Small machine bolts, rolled threads	80 and 10% off
Large machine bolts	75 and 10% off
Machine bolts, c.p.c. & t nuts, small	80% off
Machine bolts, c.p.c. & t nuts, large	75 and 5% off
Square h.p. nuts, blanked and tapped	$6.30 off list
Hexagon nuts	$7.20 off list
C.p.c. and r sq. nuts, blanked and tapped	$6.00 off list
Hexagon nuts, ⅝ and larger	$7.20 off list
Hexagon nuts, smaller than ½ in.	$7.80 off list
C.P. plain square nuts	$5.50 off list
C.P. plain hexagon nuts	$5.90 off list
Semi-fin. hex. nuts, ½ in. or under	85, 10 & 10% off
Semi-fin. hex. nuts, ⅝ in. and larger	85 & 5% off
Rivets, 7/16 x 6½, smaller & shorter	80, 10 & 5% off
Rivets, tin plated, packages	80, 10 and 5% off
Rivets, metallic tinned, packages	80, 10 and 5% off
Standard cap screws	70, 10 and 10% off
Standard set-screws	75, 10 and 10% off

Standard Pipe.—Demand for standard steel pipe continues fairly good, the buying being equal to the average of June, which with most sellers was the best month in the twelvemonth, barring last February. No additional line pipe orders of consequence are reported, but one large order has only a few details to be arranged. The mills expect good buying for gas and oil lines in the next two or three months. Discounts on

both iron and steel pipe are being quite well held, and the market is as steady as at any time for months.

Boiler Tubes.—There has been a slight improvement in demand for boiler tubes, and even locomotive tubes, which have been quite dull, have been looking up in the past week or two. Discounts continue to be shaded more or less.

Coke.—Recent negotiations against contracts for furnace coke for the balance of the year seem to have been dropped, the consumers buying small lots instead for their early requirements. It is reported that several sales for the entire month of July have been made at $1.75, while some small lots of prompt have also gone at this figure. While shipments are somewhat restricted at the moment on account of the holiday the furnaces seem to be well provided and there is no demand to-day for spot coke. While several operators adhere to $2 on second-half contracts there is coke of good grade freely offered at $1.90. The bulk of the contracting for foundry coke for the twelvemonth beginning this month is now concluded, $2.50 having been the regular price for the best grades, with occasional concessions, while other grades are freely offered at less. We quote: Prompt furnace, $1.75; contract furnace, $1.85 to $2; prompt foundry, $2.30 to $2.50; contract foundry, $2.30 to $2.50 per net ton at oven. The production of coke in the Connellsville and lower Connellsville region in the week ended June 27, as reported by the Connellsville Courier, was 261,553 tons, a decrease of 1022 tons.

Old Material.—The mills have been very light buyers of scrap in the past week and are showing no anxiety to cover for future requirements. The dealers as a rule are not in position to sell at prices offered, and outside of borings and turnings, in which there is a fair demand, there is very little doing. Prices show no quotable change, but dealers are looking for a higher rather than a lower market in the next few weeks. Dealers quote, per gross ton, for delivery to consumers' mills in the Pittsburgh and nearby districts that take the same rates of freight as follows:

Selected heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$12.00
Ordinary steel melting scrap	$11.50 to 11.75
Compressed side and end sheet scrap	11.00 to 11.25
No. 1 foundry cast	11.50 to 11.75
No. 2 foundry cast	10.25 to 10.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.50 to 8.75
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	12.75 to 13.00
No. 1 railroad malleable stock	11.00 to 11.25
Railroad grate bars	10.25 to 10.50
Low phosphorus melting stock	14.25 to 14.50
Iron car axles	22.50 to 23.00
Steel car axles	15.50 to 16.00
Locomotive axles, steel	20.00 to 20.50
No. 1 busheling scrap	10.25 to 10.50
No. 2 busheling scrap	7.25 to 7.50
Machine shop turnings	7.75 to 8.00
Old carwheels	11.25 to 11.50
Cast-iron borings	8.25 to 8.50
†Sheet bar crop ends	12.00 to 12.25
Old iron rails	13.75 to 14.00
No. 1 railroad wrought scrap	11.50 to 11.75
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	12.00 to 12.25

†Shipping point.

Chicago

CHICAGO, ILL., July 8, 1914.—(*By Wire.*)

The inclination to buy is increasing among consumers of iron and steel. They are specifying more freely for prompt shipment and pressing their claims for consideration into the future at the current low prices as far as possible. Contracting is being held in check distinctly by the attitude of the mills in their unwillingness to take business beyond the third quarter except at an advance. New car inquiry approaches 20,000 and promises for July an encouraging prospect in this direction. Structural contracts at Chicago last week approximated 10,000 tons, which is an improvement as compared with similar tonnage for some time past. The demand for sheets is noticeably broader and heavier. There have been as yet no further developments in connection with steel-bar contracting, but the present month can hardly go by without a general adjustment with the implement interests. Sales of pig iron for last half delivery are not heavy, but continue to show a degree of interest on the part of melters. There is encouraging basis for believing that once the ice is broken the waters will go out with a rush.

Pig Iron.—Selling of pig iron in this market is still limited very largely to local iron. A fairly steady selling is reported for last half delivery. For this shipment sales are being made at current prices. The few isolated instances of sales of Southern iron at $10, Birmingham, have not been followed by any reduction of the general market level from the $10.25 price. Eliminating the fact of idle furnace capacity the charcoal-iron situation appears to be well intrenched with sales in sufficient tonnage to make some inroads on stock. This is more true of the high silicon grades than Nos. 2, 3 and 4. Of the last named grade the furnaces have such a supply that one interest is known to be quoting as low as $13.50 f.o.b. furnace. The large majority of sales, however, are on the basis of our quotations, assuming freight of $1.75. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal	$15.75 to $16.75
Northern coke foundry, No. 1	14.50 to 15.00
Northern coke foundry, No. 2	13.75 to 14.25
Northern coke foundry, No. 3	13.50 to 14.00
Southern coke, No. 1 f'dry and 1 soft	15.10 to 15.35
Southern coke, No. 2 f'dry and 2 soft	14.60 to 14.85
Malleable Bessemer	14.00 to 14.25
Standard Bessemer	17.00
Basic	13.25 to 13.50
Low phosphorus	21.00 to 21.75
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. silv'y, 10 per cent.	18.90 to 19.40

(*By Mail*)

Rails and Track Supplies.—More recent information concerning the purchase of Canadian rails by the Clover Leaf System indicates that only 1000 tons will be placed in Canada, the remaining 2000 to go to a local mill. The distribution of rails by the Pennsylvania, while pretty well discounted, is a source of strength in the market. There is a more liberal buying of spikes and bolts and a local mill reports that it is six weeks behind its orders for track spikes. In street railway work the purchase of a number of special layouts is noted and there remain several attractive inquiries. We quote standard railroad spikes at 1.50c. to 1.55c., base; track bolts with square nuts, 1.90c. to 2c., base, all in carload lots, Chicago; tie plates, $25.50 to $26, f.o.b. mill net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.;; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Contracts for fabricated steel aggregating about 10,000 tons were placed last week at Chicago, including about 7000 tons for the Municipal Pier, the steel going to the South Halsted Street Iron Works. The Crane Company also placed its order with the Vierling Steel Works for the fifth section of its Corwith plant calling for 1406 tons and the city of Chicago awarded 1188 tons for the Webster avenue bridge to the Modern Steel Structural Company. Other contracts included 498 tons for the Illinois Traction Company, Terminal Building, Peoria, Ill., to Decatur Bridge Company; 202 tons for a bridge span, Monroe, Wash., to American Bridge Company; 200 tons, the Alhambra theater, Ogden, Utah, to Modern Steel Structural Company; 338 tons, Lincoln High School, Seattle, Wash., to Seattle Construction & Dry Dock Company; 300 tons for a steel ferry boat hull, to Pacific Rolling Mill Company; 240 tons, the Cory Building, Fresno, Cal., to Palm Iron Works. Specifications for plain shapes from mill are reported as being placed a little more freely. For immediate shipment orders the price of 1.25c., Chicago, has become general and for the entire third quarter a number of mills are taking contracts on a basis of 1.10c., Pittsburgh. Other mills are asking 1.15c. for delivery after August 1. We quote for Chicago delivery from mill on plain material 1.25c. to 1.28c.

In activity, the store situation appears to be in advance of mill business. We quote for Chicago delivery from jobbers stock 1.75c.

Plates.—Inquiry for cars and steel underframes, including that which is tentative as well as that which has been formally sent out, promises for the current month an even better showing than was recorded in June. That the Southern Pacific and Union Pacific railroads will buy close to 15,000 cars is confidently expected, although no inquiry has as yet appeared. The Toledo & Ohio Central inquiry for 2000 cars appears likely to be increased to 4000. The Chicago Great Western is in the market for 500 cars, the Bettendorf Axle Company is furnishing 2000 underframes to the Merchants Despatch, while the Illinois Central is figuring on steel reinforcement for about 10,000 cars which will take about that many tons. The general situation as regards plate prices has not changed and we quote for Chicago delivery from mill 1.25c. to 1.28c.

We quote for Chicago delivery of plates from store 1.75c.

Sheets.—The demand for sheets is noticeably better. Consumers appear quite keen to get under cover at the going prices, but there is little or no contracting beyond the third quarter because of the firm stand being taken by the mills in their demand for an advance for fourth quarter shipments. It is reported that one of the Ohio mills is sold up for the entire third quarter on sheets. We continue to quote for Chicago delivery from mill: No. 10 blue annealed, 1.48c.; No. 28 black, 1.93c. to 1.98c.; No. 28 galvanized, 2.88c. to 2.93c.

We quote for Chicago delivery from store as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.85c.; No. 28 black, 2.35c. to 2.45c.; No. 28 galvanized, 3.35c. to 3.45c.

Bars.—There will be required for the Municipal Pier about 1500 tons of reinforcing bars in addition to the structural material noted. The implement bar situation is unchanged, although the end of this month brings the implement manufacturers into their operating season which suggests the likelihood of some decisive action in July. Some of the smaller contracts are being closed and makers report the placing of about 10,000 tons in sight. Following the holiday about 50 per cent. of the western bar iron mill capacity is still down. We quote for mill shipments as follows: Bar iron, 1c. to 1.10c.; soft steel bars, 1.28c.; hard steel bars, 1.25c. to 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

Rivets and Bolts.—Contracting for bolts has been followed by only moderate specifications and the market is still soft for those in a position to buy advantageously. Large producing capacity continues a stumbling block in the path of recovery for rivet prices. We quote from mill as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 85-5; cut thread, 85; larger sizes, 80-5; machine bolts up to ⅜ x 4 in., rolled thread, 85-10; cut thread, 85-5; larger sizes, 80-10; coach screws, 85-15; hot pressed nuts, square head, $6.60 off per cwt.; hexagon, $7.60 off per cwt. Structural rivets, ½ to ¼ in., 1.58c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.20c.; boiler rivets, 2.30c.; machine bolts up to ¾ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to ⅜ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square head, $6, and hexagon, $6.70 off per cwt.

Hoops and Bands.—Practically nothing of importance can be reported regarding the buying of hoops and bands. Contracting has been slow and specifications are lean. We quote for Chicago delivery of bands 1.33c. and for hoops 1.43c.

Cast-Iron Pipe.—It seems practically assured that action will be taken favorable to the installation of an additional 9500 tons of 30-in. pipe at Highland Park, Mich., under revised plans. The United States Cast-Iron Pipe & Foundry Company has sold about 1500 tons to the Canada Iron Corporation on sub-contracts for Canadian cities of the Northwest. Bookings of routine orders during the week aggregated about 1000 tons. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $26; 6 to 12 in., $24; 16 in. and up, $23.50, with $1 extra for gas pipe.

Wire Products.—All branches of the wire trade are feeling the quietness of the mid-summer period and the market is accordingly without feature. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, $1.53; wire nails, $1.68 to $1.73; painted barb wire, $1.68 to $1.73; galvanized, $2.13 to $2.18; polished staples, $1.68 to $1.73; galvanized, $2.03 to $2.08, all Chicago.

Old Material.—The tonnage of scrap available for sale is entirely out of proportion to the demand and the problem is largely one of finding a place to deliver incoming material at the best price obtainable. The general level of prices is about as it was a week ago with perhaps an accentuation of weakness in one or two instances. Railroad scrap offered this week is limited to 2300 tons from the Chicago, Milwaukee & St. Paul, of which 500 tons is No. 1 cast. We quote, for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$12.25 to $12.75
Old steel rails, rerolling	11.50 to 11.75
Old steel rails, less than 3 ft.	10.25 to 10.50
Relaying rails, standard section, subject to inspection	22.00 to 23.00
Old carwheels	11.25 to 11.50
Heavy melting steel scrap	9.75
Frogs, switches and guards, cut apart	9.75
Shoveling steel	9.25
Steel axle turnings	6.75 to 7.25

Per Net Ton

Iron angles and splice bars	$12.00 to $12.25
Iron arch bars and transoms	12.00 to 12.50
Steel angle bars	8.75 to 9.25
Iron car axles	16.25 to 16.75
Steel car axles	12.00 to 12.25
No. 1 railroad wrought	9.00 to 9.25
No. 2 railroad wrought	8.75 to 9.00
Cut forge	8.50 to 8.75
Steel knuckles and couplers	9.00 to 9.50
Steel springs	9.25 to 9.75
Locomotive tires, smooth	9.50 to 9.75
Machine shop turnings	5.00 to 5.50
Cast borings	4.50 to 5.00
No. 1 busheling	7.50
No. 2 busheling	6.00 to 6.25
No. 1 boilers, cut to sheets and rings	6.50 to 7.00
Boiler punchings	9.25 to 9.75
No. 1 cast scrap	9.75 to 10.25
Stove plate and light cast scrap	8.75 to 9.00
Grate bars	8.50 to 8.75
Railroad malleable	9.00 to 9.25
Agricultural malleable	8.00 to 8.25
Pipes and flues	6.50 to 7.00

The Consolidated Rail & Iron Company has been incorporated with a capital stock of $1000 by Elizabeth Brady, Maurice Gravitz and Samuel A. Miller, 155 North Clark street, Chicago, to deal in iron and steel scrap, machinery, etc.

Philadelphia

PHILADELPHIA, PA., July 7, 1914.

In a few directions betterment is shown in the volume of sales in this district, and in sentiment there is some improvement all along the line. Prices have not departed from their low levels, however, and it is generally agreed that only a concerted and sustained demand will cause them to rise to a satisfactory basis. The report of the distribution of its steel rail orders by the Pennsylvania Railroad had a bracing effect on the trade, while another source of encouragement is the larger number of sales made by pig-iron sellers who find that they booked more tonnage in June than in any month since January. They are still receiving more active inquiry, with larger quantities specified, than has been the case in recent months, though business is yet under normal. The activity in foundry coke has been correspondingly better. The steel-bar requirements which are coming out are stimulating to the trade, and the demand for sheets is expected to improve about the middle of the month. The current demand for plates shows little change. Billets and structural material are in light demand, and some time must elapse before output can get under good headway. A good symptom is that the Fourth of July shut-downs were not so complete as was expected, although they were sufficient to cause some modification of scrap deliveries.

Iron Ore.—The chief interest here lies in the arrival of the second cargo of Chilean ore from Cruz Grande. The vessel is now unloading at Port Richmond, and where samples have been obtained by the local trade they are studied carefully. The ore is a dense mineral, and the invariable comment is that it will be hard to smelt. From the fact that it is being loaded on flat cars with low sides, it is deducted that the ore is to be piled for the present. The cargo consists of 7280 tons. Other arrivals include 11,960 tons from Cuba, 21,855 tons from Sweden and 6500 tons from Africa. New business is as quiet as heretofore, despite the low prices now quoted.

Pig Iron.—Considering the limited extent of recent buying, there has been a fair run of transactions involving odd lots, interspersed with a few sales of good-sized lots, in the last week. So far as foundry irons are concerned, June turned out to be the best month in volume of sales since January. Prices are no stronger, despite the action of one central Pennsylvania furnace in advancing its quotations 25c. per ton, and while most sellers assert that quotations are steady, the fact remains that there is still some shading to get business. Steel-making irons have been inactive, with the exception of the routine movement of small lots of standard low phosphorus. Some little sign of interest in basic has been shown by a Harrisburg company. Mentioned among the larger transactions of the week are the purchase of 1000 tons of No. 2 plain by a Trenton radiator manufacturer; 2000 tons of pipe iron by a local consumer; 1000 tons of Southern gray forge at $13.70, Philadelphia, for July delivery, and 500 tons of Virginia No. 2 X, which was taken by a Reading textile machinery maker at something under $12.75 at furnace. There is considerable talk of the offering of Virginia iron at concessions, but the quality is questioned and the quantity is said to be limited. Sellers of standard brands are holding to quoted prices, one such agency having sold 600 tons in lots at full prices. Furnace stocks of Virginia iron increased slightly in June, but orders increased proportionately. Quotations continue unchanged, with the bottom of the range more nearly approximating actual selling prices. The following prices are for standard brands delivered to buyers' yards in this territory:

Eastern Penna. No. 2 X foundry	$14.75 to $15.00
Eastern Penna. No. 2 plain	14.50 to 14.75
Virginia No. 2 X foundry	15.55 to 15.75
Virginia No. 2 plain	15.30 to 15.55
Gray forge	13.75 to 14.00
Basic	14.00
Standard low phosphorus	20.50 to 21.00

Ferroalloys.—The market is no more active than it has been in recent weeks. The quotations for English 80 per cent. ferromanganese is declared to be unchanged at $38, despite reports of sales at 50c. per ton less at Pittsburgh for English and that the price of German has been reduced to $37. Ferrosilicon has been equally as quiet, with 50 per cent. at $71 to $73, Pittsburgh, according to quantity.

Bars.—Some of the excellent business in steel bars which was prospective a week ago is still pending, though daily expected to be closed. Included in this are the requirements of the Sheldon Axle Company, Wilkes-Barre, Pa., whose contract will cover about 30,000 tons of spring steel and axle billets. Makers of steel bars are quoting 1.30c., Philadelphia, on contracts, but taking some spot business in desirable lots at 1.25c. Iron bars have had a little better demand at the prevailing low prices, 1.17½c. to 1.20c., Philadelphia.

Structural Material.—Little or no improvement is shown in this district and prices show no betterment under the circumstances. There is, however, one large prospect before the trade and possibly another. The Philadelphia Electric Company is to construct a power plant at Twenty-eighth and Christian streets, this city, which will require about 5000 tons. The general contract is reported to have gone to the Fidelity Construction Company, and it is thought probable that the American Bridge Company will furnish the steel. The possibility of importance is that the extension to the Traymore Hotel, Atlantic City, referred to a week ago, may be a steel instead of a concrete structure, inasmuch as alternate bids have been asked for. If it is of steel construction, between 4000 and 5000 tons would be required. A phase of current business which is not pleasing to mill representatives is that they are meeting competition from jobbers who are making low prices on material out of their stock. Prices are unchanged at 1.30c., Philadelphia, for small lots, and 1.25c. for desirable quantities.

Plates.—The demand continues unsatisfactory, with orders mostly small and given as material is needed. Contracts are being added at prevailing prices only where it is necessary to hold customers. The Baltimore & Ohio Railroad has ordered between 500 and 800 tons from a Coatesville mill. The third quarter quotation is 1.30c., Philadelphia, but 1.25c. can still be done where the business warrants.

Billets.—The demand is almost dormant in this territory and there is consequently little on which to base the price, although $21.90 would be accepted for basic open-hearth rolling billets. Forging steel commands the usual advance of $4 to $5 a ton. Manufacturers in this district are operating at only a trifle over 50 per cent. of capacity.

Sheets.—No betterment has come as yet, but considerable activity is looked for after the middle of July. No. 10 blue annealed is unchanged at 1.50c.

Coke.—In foundry coke there have been some good sales for future delivery and more are pending. Of one brand, 2300 tons figured in one transaction at $2.70, at oven. Furnace coke has been quiet, although one sale of 12,000 tons was made to an eastern Pennsylvania furnace at $1.85. The range of prices is about $2.50 to $2.75 per net ton at oven for foundry coke and $1.85 to $2 for furnace. Freight rates to this city from the principal producing districts are as follows: Connellsville, $2.05; Latrobe, $1.85, and Mountain, $1.65.

Old Material.—The Fourth of July holiday has accentuated the slow demand for steel scrap and caused some deferring of shipments or a part of them, though the general sentiment seems to be better. The first of the month railroad offerings were a little lighter than usual, while those from outside sources are lighter also, borings and turnings, in particular, being offered in smaller quantities. On the other hand, there is a better inquiry for old carwheels and cast-iron scrap. In prices there has been no change. The market for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates varying from 35c. to $1.35, per gross ton, is as follows:

No. 1 heavy melting steel	$10.50 to $11.00
Old steel rails rerolling	12.00 to 12.50
Low phosphorus heavy melting steel scrap	14.00 to 14.50
Old steel axles	14.00 to 14.50
Old iron axles (nominal)	20.00 to 21.00
Old iron rails	15.00 to 15.50
Old carwheels	11.00 to 11.50
No. 1 railroad wrought	12.50 to 13.00
Wrought-iron pipe	9.25 to 9.75
No. 1 forge fire	8.00 to 8.50
Bundled sheets	8.00 to 8.50
No. 2 light iron	5.00 to 5.50
No. 2 busheling	8.00 to 8.50
Wrought turnings	7.75 to 8.25
Cast borings	8.00 to 8.50
No. 1 cast	12.00 to 12.50
Grate bars, railroad	8.00 to 8.50
Stove plate	8.50 to 9.00
Railroad malleable	9.00 to 9.50

Cleveland

CLEVELAND, OHIO, July 7, 1914.

Iron Ore.—Ore shipments so far this season are only about 60 per cent. of what they were a year ago. While the June movement shows an improvement over the previous month, when compared with the corresponding months last year, it is doubtful if the gain will be kept up later in the season. The latest estimates of the season's movement are that it will not exceed 32,000,000 tons, or about the same as in 1911. There is less activity on the Lake Superior ranges than during the summer season for many years. A number of additional mines have been shut down during the past ten days. One leading ore firm, which operates over 30 mines, at present has only three of its mines in operation. We quote prices as follows: Old range Bessemer, $3.75;

Mesaba Bessemer, $3.50; old range non-Bessemer, $3; Mesaba non-Bessemer, $2.85.

Pig Iron.—The Kokomo Steel & Wire Company, Kokomo, Ind., which has a new open-hearth steel plant under consideration, has come into the market for 15,000 tons of basic iron for the last half. One Ohio furnace company reports the sale of 3700 tons of iron, 1500 tons of which was malleable and the remainder foundry iron. The latter included one 1000-ton lot. A Cleveland foundry has bought 2000 tons of Valley No. 2 foundry at $12.85 at furnace for last half. There is an inquiry from a Massillon consumer for 1000 tons. Little other inquiry is coming out in the northern Ohio territory. However, the general feeling in the trade is better, although not much activity is expected in the next few weeks. Outside of this immediate territory an improvement in the situation is found in the fact that some of the implement makers who have been holding back on shipments are now specifying on foundry iron contracts. The large crops appear to have stimulated a demand for farm implements so that conditions with these companies have improved. Southern iron is quiet. While $10.25 Birmingham is the general quotation, it is understood that some Southern iron for prompt shipment can be had at $10. We quote delivered Cleveland as follows:

Bessemer	$14.90
Basic	$13.75 to 13.90
Northern No. 2 foundry	13.75
Southern No. 2 foundry	14.60
Gray forge	13.50
Jackson Co. silvery, 8 per cent. silicon	17.55
Standard low phosphorus, Valley furnace	20.25

Coke.—The leading sanitary interest has contracted for 35,000 to 40,000 tons of Connellsville foundry coke for its Eastern plants and 20,000 tons of Virginia coke for its Louisville plant for delivery during twelve months. Foundry grades are slightly weaker, good makes being offered at $2.40 for contracts for a year. The round tonnage sales noted above are understood to have been made at prices below ruling quotations. Furnace coke is inactive. We quote standard makes of furnace coke for prompt shipment at $1.75 per net ton at oven, and for contracts for the last half at $1.85 to $2. Standard makes of 72-hr. foundry coke are quoted at $2.40 to $2.50 for delivery until July 1, 1915. Some foundry coke contracts are being closed, but quite a few customers are holding off in the hope of getting $2.25 fuel.

Finished Iron and Steel.—Little new business is coming out, but an improvement is expected when plants start up that are now shut down for inventory. Manufacturers' stocks are low and few have placed contracts so that the bulk of the new demand will be in current orders. A firmness is shown in the market by the fact that attempts to secure concessions along the two lines so far failed. Mills have resisted efforts of buyers to purchase material, particularly steel bars, below 1.10c. for early delivery, and have held to their refusal to make contracts with the implement trade beyond January 1. The structural situation continues quiet, the only new inquiry being for 500 tons for a Hippodrome building in Youngstown. Iron bars are dull, with the price unchanged at 1.20c., Cleveland, for Cleveland delivery. Steel bars for reinforcing purposes are in fair demand. Sheets are not active, but some third quarter contracts are being closed at ruling prices. These are 1.80c. to 1.85c. for No. 28 black, 2.80c. to 2.85c. for No. 28 galvanized and 1.35c. for No. 10 blue annealed. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—There is considerable inquiry for bolt contracts. Prices are weak and users are anxious to cover for the last half at the present minimum quotations. Implement manufacturers want to place contracts for a full year on the same basis, but bolt makers are refusing to contract beyond January 1. While no formal reductions have been made we have reduced all bolt prices to meet present conditions, the quotations below fairly representing the market for car lots. Nut prices are unchanged. Rivets are being fairly well maintained at 1.50c. for structural and 1.60c. for boiler rivets for car lots. We quote discounts as follows: Common carriage bolts, ⅜ x 6 in., smaller or shorter, rolled thread, 80 and 20 per cent.; cut thread, 80 and 15 per cent.; larger or longer, 75 and 15 per cent.; machine bolts with h. p. nuts, ⅜ x 4 in., smaller or shorter, rolled thread, 80 and 25 per cent.; cut thread, 80 and 20 per cent.; larger or longer, 80 per cent.; coach and lag screws, 80 and 25 per cent.; square h. p. nuts, blank or tapped, $6.30 off; hexagon h. p. nuts, blank or tapped, $7.20 off; c. p. c. and t. square nuts, blank or tapped, $6 off; hexagon, ⅝ in. and larger, $7.20 off; 9-16 in. and smaller, $7.80 off; semi-finished hexagon nuts, ⅝ in. and larger, 85, 10 and 5 per cent.; 9-16 in. and smaller, 85, 10, 10 and 5 per cent.

Old Material.—With some mills shut down for repairs and inventory time buyers are taking no interest in the scrap market, which is practically at a standstill. Dealers, however, look for a slight improvement the coming week. While no definite inquiries have been sent out it is understood that one or two local mills will take on a fair tonnage of heavy steel scrap if they can buy it at the right price. Quotations are unchanged. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton	
Old steel rails, rerolling	$11.50 to $12.00
Old iron rails	13.00 to 13.50
Steel car axles	15.00 to 15.25
Heavy melting steel	10.25 to 10.75
Old carwheels	11.25 to 11.50
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	10.25 to 10.75
Light bundled sheet scrap	7.50 to 8.00

Per Net Ton	
Iron car axles	$18.00 to $19.00
Cast borings	5.50 to 6.00
Iron and steel turnings and drillings	5.25 to 5.50
Steel axle turnings	6.75 to 7.25
No. 1 busheling, new	8.25 to 8.50
No. 1 busheling, old	8.00
No. 1 railroad wrought	9.50 to 10.00
No. 1 cast	10.50 to 10.75
Stove plate	7.50 to 8.00

Buffalo

BUFFALO, N. Y., July 8, 1914.

Pig Iron.—General indications are that a livelier interest is being manifested in pig iron for forward requirements by users than has been noted during the past few weeks. Only a moderate tonnage is reported as placed for the week, however, but a considerable total is still under negotiation. Current conditions with the foundries show little change for the better, but in some quarters an improvement is noted in anticipation of the approach of the fall manufacturing season. Prices are practically unchanged, $13 at furnace being apparently rock bottom for any grade for the different producing interests in this district. Some furnacemen claim to be holding more firmly to schedules and refusing to sell at low prices. We quote as follows, f.o.b. furnace, for last half delivery:

No. 1 foundry	$13.25 to $13.75
No. 2 X foundry	13.00 to 13.25
No. 2 plain	13.00 to 13.25
No. 3 foundry	13.00
Gray forge	13.00
Malleable	13.00 to 13.50
Basic	13.50 to 13.75
Charcoal, regular brands and analysis	15.75 to 16.75
Charcoal, special brands and analysis	20.50

Finished Iron and Steel.—Some of the selling agencies report that the number of orders received during the past week was the largest for any week of the year. These covered a miscellaneous range of bars, plates, shapes and other products. One order placed during the week from the interior of the state called for between 5000 and 6000 tons of steel bars. Some contracts have been closed for delivery over the remainder of the year by various classes of users. Prices remain at about the same status as for last week. No contracts accepted at lower than 1.15c. for third quarter or 1.20c. for fourth quarter, with immediate delivery business taken at 1.10c., except for less than carload lots on which 1.15c. still rules. Bids are to be opened July 21 for structural steel requirements and other materials for the construction of the Lehigh Valley passenger terminal in Buffalo, to cost, with approaches, between $4,000,000 and $5,000,000. Contract for the steel for the Onondaga Hotel addition, Syracuse, 1200 tons, has finally been awarded to John Eichley, Jr., Pittsburgh.

Old Material.—Considerable increase is noted in inquiry for some grades of scrap, particularly for heavy melting steel, borings and turnings. Consumers are not yet offering prices that would induce sales of large tonnages in these lines, however, and dealers are of the opinion that better prices can be obtained in the near future. We quote as follows per gross ton, f.o.b. Buffalo:

Heavy melting steel	$10.25 to $10.50
Low phosphorus steel	14.00 to 14.50
Boiler plate sheared	11.50 to 12.00
No. 1 railroad wrought scrap	10.00 to 10.50
No. 1 railroad and machinery cast	10.50 to 11.00
Old steel axles	12.50 to 13.00
Old iron axles	19.00 to 20.00
Old carwheels	10.50 to 11.00
Railroad malleable	9.75 to 10.00
Machine shop turnings	5.25 to 5.75
Heavy axle turnings	7.50 to 8.25
Clean cast borings	6.00 to 6.50
Old iron rails	13.00 to 13.75
Locomotive grate bars	8.50 to 9.00
Stove plate (net ton)	9.00 to 9.75
Wrought pipe	7.50 to 8.00
Bundled sheet scrap	6.25 to 6.50
No. 1 busheling scrap	8.25 to 8.75
No. 2 busheling scrap	5.75 to 6.25
Bundled tin scrap	10.50

Cincinnati

CINCINNATI, OHIO, July 8, 1914—*(By Wire.)*

Pig Iron.—The limited activity in the market affords little local comment. The first half of July is generally a time when most melters of both basic and foundry iron are busy taking inventories and making repairs. The present season is by no means the dullest in the history of the trade, but the volume of business transacted is below the general average. Private sales have been made to consumers who are in need of iron and also to other melters who are financially able to take advantage of the low prices prevailing. But as a general rule buyers are not willing to make contracts for anything beyond third-quarter requirements. Requests for quotations on iron for shipment in the fore part of next year are received somewhat suspiciously as being merely bids for information on the market's future. No prices have yet been named by either Northern or Southern producers for this delivery. Although prices are soft, approximately 400 tons of Northern malleable was booked by an Ohio manufacturer at $13.50, Ironton basis, for last half shipment. A few small sales of foundry iron are also reported at the same figure, but the slack demand and the amount of resale iron offered 25c. below this price are not very encouraging for the furnaces in the Hanging Rock district. Some Southern iron, for prompt shipment, has also appeared that is obtainable at $10, Birmingham, and the market price of Southern iron has reached a lower level than for some time past. A central Ohio firm is about to close for 500 tons of Northern foundry iron and there are a small number of inquiries for limited tonnages from nearby foundries. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$13.75 to $14.25
Southern coke, No. 2 f'dry and 2 soft	13.25 to 13.75
Southern coke, No. 3 foundry	12.75 to 13.25
Southern No. 4 foundry	12.25 to 12.75
Southern gray forge	11.75 to 12.25
Ohio silvery, 8 per cent. silicon	17.20 to 17.70
Southern Ohio coke, No. 1	15.45 to 15.95
Southern Ohio coke, No. 2	14.45 to 14.95
Southern Ohio coke, No. 3	14.20 to 14.45
Southern Ohio malleable Bessemer	14.45 to 14.95
Basic, Northern	14.45 to 14.95
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel	27.25 to 27.75

(By Mail)

Coke.—The holiday season caused a let up in the demand for foundry coke and there is practically no interest taken in furnace grades. It is currently reported that lower prices named confidentially did not prove to be a sufficient inducement to buyers to cover very far ahead. Connellsville furnace coke is quoted from $1.70 to $1.90 per net ton at oven. Foundry coke is sold all the way from $2.25 to $2.60 at oven in the three districts. Wise County and Pocahontas producers continue asking about 10c. to 20c. a ton more than is quoted by the Connellsville operators.

Finished Material.—Sentimentally, the market shows some improvement. The better shipments made during the month of June probably have had some effect toward a better feeling. However, new business continues scarce, and the mills in this vicinity are still not anxious to make any long-time contracts at present prices. This statement applies more especially to the sheet mills. No. 28 black sheets are quoted at 1.95c., Cincinnati, or Newport, Ky., and galvanized sheets at 2.90c. There is some business in sight in this territory for structural material for bridge building. It is also understood that, considering the season, the local stores have had a fair trade in small structural shapes and steel bars around 1.75c. to 1.80c.

Old Material.—The market is in such shape that it is difficult to name quotations. An embargo on shipment of scrap iron to another rolling mill in this vicinity has been declared, and with the demand cut off from the larger nearby consumers of old material, the outlook is considered somewhat gloomy. Stove plate has been one grade that seems to be holding its own. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio, and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton

Bundled sheet scrap	$6.75 to $7.25
Old iron rails	11.75 to 12.25
Relaying rails, 50 lb. and up	19.75 to 20.25
Rerolling steel rails	10.75 to 11.25
Melting steel rails	9.25 to 9.75
Old carwheels	10.25 to 10.75

Per Net Ton

No. 1 railroad wrought	$8.75 to $9.25
Cast borings	4.50 to 5.00
Steel turnings	4.50 to 5.25
Railroad cast scrap	9.25 to 9.75
No. 1 machinery cast scrap	10.25 to 11.25
Burnt scrap	6.00 to 6.75
Old iron axles	15.50 to 16.00
Locomotive tires (smooth inside)	9.75 to 10.25
Pipes and flues	6.25 to 6.75
Malleable and steel scrap	7.25 to 7.75
Railroad tank and steel scrap	5.25 to 5.75

Birmingham

BIRMINGHAM, ALA., July 6, 1914.

Pig Iron.—Prices are a trifle softer, rather than firmer. A fair volume of sales continues, with one interest reported as having been a liberal seller in the Middle West and other territory. One maker disposed of 1800 tons in carload to 500-ton lots at $10.25 for third quarter. Little has yet been done for the fourth quarter. Iron makers are now firm in their belief that recent sales have been for consumption and little if any for speculation, although one consumer, after supplying his wants for the remainder of this year, bought 1000 tons at prevailing prices for 1915 delivery. The large accumulation at furnaces, which, it is understood, did not diminish in June is a factor of weakness. There are about 175,000 tons of free foundry iron on yards in addition to some warrant and basic metal. These accumulations must be eaten into before any great strength in prices is acquired. There has been some $10 business done in competitive territory. This appears to be of a sporadic character rather than a steady price offering, but it is believed that considerable tonnage has gone on that basis. It is even reported that some southern consumers have obtained $10 iron. As a rule, furnacemen continue to hold for $10.25 for third quarter with $10.50 asked for the fourth. Freight differentials, where they exist, are doubtless waived in instances. The holiday in the coal, iron and steel trades was only a week-end affair, plants resuming on Monday. We quote, per gross ton, f.o.b. Birmingham district furnaces, for third and fourth quarter as follows:

No. 1 foundry and soft	$10.75 to $11.00
No. 2 foundry and soft	10.25 to 10.50
No. 3 foundry	9.75 to 10.00
No. 4 foundry	9.50 to 9.75
Gray forge	9.25 to 9.50
Basic	10.00 to 10.25
Charcoal	23.50 to 24.00

Cast-Iron Pipe.—Little is reported in the way of new orders in the pipe trade. Manufacturers see no present prospect of increasing output and some pits remain shut down. Prices are reported as not well maintained. The Superior Pipe Company, Bessemer,

Ala., has completed its plant and started operations. Robert Campbell and others will build a plant in Gadsden. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., $20.50; 6-in. and upward, $18.50, with $1 added for gas pipe.

Coal and Coke.—A large volume of renewal coal contracts have been recently placed in the Birmingham district by various railroads, but there has been no new business in some time. Mining operations are gradually increasing. Domestic mines are busier than they have been owing to yard stocking in the retail yards. Coke is neither dull nor active, prices remaining the same. The Gulf States Steel Company will add to the output, having fired 300 ovens at Virginia mines incident to the prospect of resumption of blast-furnace operations at Gadsden. We quote, per net ton, f.o.b. oven, as follows: Furnace coke, $2.75 to $2.90; foundry, $3 to $3.25.

Old Material.—The scrap market is apparently at a standstill, with not enough business going to make quotations reliable. Nominal quotations, per gross ton, f.o.b. dealers' yards, are as follows:

Old iron axles	$14.50 to $15.00
Old steel axles	14.50 to 15.00
Old iron rails	13.00 to 13.50
No. 1 railroad wrought	10.00 to 11.00
No. 2 railroad wrought	8.50 to 9.00
No. 1 country wrought	9.00 to 10.00
No. 2 country wrought	8.00 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	8.00 to 8.50
Tram carwheels	9.50 to 10.00
Standard carwheels	10.50 to 11.00
Stove plate	8.00 to 8.50

St. Louis

ST. LOUIS, MO., July 6, 1914.

Pig Iron.—Enough interest is shown in pig iron to indicate that very little is needed to set a good buying movement under way. Prices are considerably firmer than they have been, though no advance is reported. Transactions are quite numerous, considering the period, but are for the most part in lots of 200 tons or less. Included in the larger sales was one of 350 tons of Lake Superior charcoal, one of 200 tons of Northern No. 2 foundry and several smaller tonnages of Southern iron. As most of the sales were for last half delivery, the impression is strong that additional buying will come soon. An inquiry remaining unfilled to-day was for 500 tons of Northern coke iron for last half delivery.

Coke.—Business in coke has been quiet for the past week, the recent activity over annual contracts having practically passed. Only small lot orders for immediate use are being entered and for these the price is slightly above the market. By-product coke is quoted at $5.20 per net ton, St. Louis delivery, but the $2.30 Connellsville price would be met if necessary on a contract of any size for prompt shipment.

Finished Iron and Steel.—The aggregate of business for the past week held up in spite of the holiday and the reports of mail business this morning were of a satisfactory character. The only large item under consideration is the Dallas, Tex., terminal which went to a St. Louis general contractor, who is still figuring on the steel for the sub-letting. The tonnage is very attractive and will be sharply competed for. Bars are in fair demand, especially reinforcing material. Standard section steel rails show no new activity and light rails are in only fair request. Track fastenings are in better demand than for some time. The Wabash has put out a revised inquiry for 1000 box cars, a previous inquiry having been withdrawn.

Old Material.—Scrap continues to show a better tone and the quotations are stronger this week than last. Actual trade is in a stagnant condition, however, the consumers being supplied for some time ahead and the dealers being unwilling to let scrap leave their yards at present prices or at least at prices which the consumers would regard as sufficiently favorable to justify them in adding to their yard piles. Nevertheless there is a belief on the part of both dealers and consumers that the near future will bring activity and higher prices. Lists out and closing this week are as follows: Frisco, 1700 tons; Wabash, 1200 tons; Mobile & Ohio, 1000 tons; Chicago, Peoria & St. Louis, 400 tons; Kansas City Southern, 200 tons. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton	
Old iron rails	$11.00 to $11.25
Old steel rails, rerolling	11.25 to 11.50
Old steel rails, less than 3 ft.	10.50 to 10.75
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	11.00 to 11.25
No. 1 railroad heavy melting steel scrap	10.50 to 10.75
Shoveling steel	8.00 to 8.50
Frogs, switches and guards cut apart	10.50 to 10.75
Bundled sheet scrap	5.00 to 5.25
Per Net Ton	
Iron angle bars	$10.00 to $10.50
Steel angle bars	9.25 to 9.50
Iron car axles	16.75 to 17.25
Steel car axles	11.75 to 12.25
Wrought arch bars and transoms	11.00 to 11.50
No. 1 railroad wrought	8.00 to 8.25
No. 2 railroad wrought	8.00 to 8.25
Railroad springs	9.25 to 9.50
Steel couplers and knuckles	9.25 to 9.50
Locomotive tires, 42 in. and over, smooth	8.75 to 9.25
No. 1 dealers' forge	7.75 to 8.00
Mixed borings	4.00 to 4.25
No. 1 busheling	7.25 to 7.50
No. 1 boilers, cut to sheets and rings	5.75 to 6.25
No. 1 cast scrap	9.50 to 10.00
Stove plate and light cast scrap	8.25 to 8.75
Railroad malleable	8.00 to 8.25
Agricultural malleable	7.50 to 8.00
Pipes and flues	5.75 to 6.25
Railroad sheet and tank scrap	5.75 to 6.00
Railroad grate bars	7.25 to 7.50
Machine shop turnings	5.00 to 5.25

New York

NEW YORK, July 8, 1914.

Pig Iron.—A somewhat larger volume of sales is reported by leading agencies. Transactions of the past week included 10,000 tons of foundry, bought by the General Electric Company. Buying now appears to be assuming a more general character. Whereas the purchases of June were made mainly by manufacturers of specialties, the buying has of late come from a greater variety of consumers. Little prompt buying is being done, most transactions being for deliveries through the third quarter or last half. These contracts have seldom been for more than 100 tons per month. Although reports are current of Buffalo prices having been shaded, a sale of several hundred tons on the basis of $13, Buffalo, for No. 2 X foundry, indicates some degree of firmness in that market. Some sales of Southern iron are reported to have been made in this territory on the basis of $10, Birmingham, for No. 2 foundry. The decision of the Interstate Commerce Commission in the Sloss-Sheffield case, ordering railroad companies to reduce their freight rates at least 35c. per ton from Alabama furnaces to Northern points, which was announced yesterday, has not yet influenced prices, but it is regarded as probable that it will have some effect in this direction within the next few days. The price for the East River cast-iron segments is stated to be $26.60 per ton machined and delivered, which is within 10c. per ton of the low prices made some years ago for the North River tunnel castings. We continue to quote Northern iron for tidewater delivery as follows: No. 1 foundry, $14.75 to $15; No. 2 X, $14.45 to $14.70; No. 2 plain, $14.25 to $14.50. Southern iron is quoted at $14.75 to $15 for No. 1 and $14.25 to $14.75 for No. 2.

Ferroalloys.—No interest is manifested in the market and sales, or even inquiries, for small lots are practically negligible. The reduction in the price of German 80 per cent. ferromanganese of $1 per ton to $37, seaboard, for shipment in 1914, is announced. This is understood to be due to a desire to move recent accumulations. The quotation for the English ferromanganese still remains at $38, seaboard, while 50 per cent. ferrosilicon is selling at $71 to $73, Pittsburgh, depending on the tonnage.

Finished Iron and Steel.—The usual midsummer quiet is taken to explain in part the diminished activity in structural lines, but the long-time apathy in financial circles toward building loans is believed to have been increased by the recent large mercantile failure in New York. Buyers are slow to contract in general finished lines, indicating no fear that present prices will rise at all soon. The recognition of the low price level is

proved by numbers of requests for contract quotations for a whole year. Lots of steel bars of 100 tons have sold at the basis of 1.10c., Pittsburgh, in New York State and New England, but for any desirable tonnage for shipment at the mills' convenience 1.10c. now is easily secured. Mills are holding stiffly on contract business at 1.15c., Pittsburgh, for the third quarter, and 1.20c. for the fourth quarter, but it is reported that some business has been written at 1.12½c. and 1.15c. for the third and fourth quarters, respectively. So far general business has fallen below the rate of June, but the extra holidays have not been favorable to closing business. In bar iron alone is the average run of business reported. Among late structural awards may be mentioned 1000 tons for the Onondaga Hotel addition, Syracuse, to John Eichleay, Jr.; 300 tons to the State Forestry Building, Syracuse, to the Dover Boiler Works; 200 tons for the Long Island Railroad, Fifth avenue, Brooklyn, to the McClintic-Marshall Company; 1000 tons for the South Ferry (Chesebrough) building, to the Levgar Structural Company; 700 tons for the garage of the Automobile Club of America, to the American Bridge Company; 225 tons for Pratt Institute, Brooklyn, to the Hedden Iron Construction Company; 400 tons for the Tissue Company, Saugerties, N. Y., to the Pittsburgh Bridge & Construction Company; 450 tons for a highway bridge, Bethlehem, Albany County, N. Y., to the Penn Bridge Company; 900 tons for the Pennsylvania Railroad between Pittsburgh and Steelton, to the Pennsylvania Steel Company, and 250 tons for the Ward Motor Vehicle Company, Mt. Vernon, N. Y., to the McClintic-Marshall Company. We quote mill shipments of steel bars, shapes and plates at 1.10c. to 1.15c., Pittsburgh, or 1.26c. to 1.31c., New York, with the lower price in the case of bars, particularly, for desirable lots at mills' convenience. We quote iron bars at 1.20c. to 1.25c., New York. For lots from store we quote iron and steel bars at 1.80c. to 1.85c., New York, and plates and structural material at 1.85c. to 1.90c.

Cast-Iron Pipe.—The Metropolitan Sewerage Commission, Boston, will open bids today on 700 tons of 60-in. No other municipal lettings of consequence are in sight at present. Private buying continues to show increasing activity, but prices remain at the low level recently reached. Bids, however, are getting close to one another and the scale is often tipped at very small differences. Carload lots of 6-in. continue to be quoted at $20.50 to $21 per net ton, tidewater.

Old Material.—If possible, trade in old material has been lighter in the past week than at any time recently. Consumers having contracts for scrap are insistent in having deliveries postponed. A striking example of this is shown in the case of a large steel company in eastern Pennsylvania, which has requested a dealer to hold back a shipment of 100 tons, due this month. Consumers are still making heavy rejections of old material. Rolling-mill stock is in almost no demand, while cast scrap seems to be equally neglected. A consumer of cast scrap in New Jersey who sent out an inquiry about 10 days ago for 500 tons is understood to have closed at something under $12 delivered, with a freight rate of $1.40 from New York. The supply of scrap from railroad companies shows no signs of diminution, and dealers are quite discouraged over the outlook. The following are dealers' quotations per gross ton, New York:

Old girder and T rails for melting	$7.75 to	$8.25
Heavy melting steel scrap	7.75 to	8.25
Relaying rails	21.00 to	21.50
Rerolling rails (nominal)	10.00 to	10.50
Iron car axles	17.00 to	17.50
Steel car axles	11.50 to	12.00
No. 1 railroad wrought	10.00 to	10.50
Wrought iron track scrap	8.75 to	9.25
No. 1 yard wrought, long	8.25 to	8.75
No. 1 yard wrought, short	7.75 to	8.25
Light iron (nominal)	3.25 to	3.50
Cast borings	5.50 to	5.75
Wrought turnings	5.25 to	5.50
Wrought pipe	7.00 to	7.50
Carwheels	9.25 to	9.75
No. 1 heavy cast broken up	10.00 to	10.50
Stove plate	7.50 to	8.00
Locomotive grate bars	6.00 to	6.25
Malleable cast	7.25 to	7.75

Boston

BOSTON, MASS., July 7, 1914.

Old Material.—The market still shows no life. Prices have not changed. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	$8.25 to	$8.50
Low phosphorus steel	13.75 to	14.75
Old steel axles	13.25 to	13.75
Old iron axles	21.25 to	21.75
Mixed shafting	12.00 to	12.25
No. 1 wrought and soft steel	9.00 to	9.25
Skeleton (bundled)	5.50 to	5.75
Wrought-iron pipe	7.50 to	7.75
Cotton ties (bundled)	6.00 to	6.25
No. 2 light	3.75 to	4.25
Wrought turnings	5.00 to	5.50
Cast borings	5.25 to	5.75
Machinery, cast	11.25 to	11.50
Malleable	8.00 to	8.25
Stove plate	7.75 to	8.00
Grate bars	5.25 to	5.50
Cast-iron carwheels	11.00 to	11.25

GERMAN MARKETS WEAK

Business Restricted and Lower Prices Being Made—Progress of Combinations

BERLIN, June 26, 1914.

Weakness continues to characterize the iron market, owing chiefly to the fact that progress with the steel organizations has not come up to expectations. Somewhat lower prices in bars and plates are quoted this week. In the Rhenish-Westphalian district about 92 to 93 marks ($21.90 to $22.13) is now the price of bars for the home trade, while export orders are taken at 82 to 84 marks ($19.52 to $19.75), f.o.b. Antwerp, and one newspaper quotes even as low as 81 marks ($19.28). Heavy plates have fallen to 96 to 97 marks ($22.85 to $23.09) in the home trade, which denotes the lowest level touched for years. Some works even give a discount of 1½ per cent. upon the prices named. On the other hand, prices of 97 to 98 marks ($23.09 to $23.32) are maintained by others that are better employed. For export the price ranges between 96 and 98 marks ($22.85 to $23.32), f.o.b. Antwerp. Plates of medium thickness cost in the home trade 106 to 108 marks ($25.23 to $25.70) and 95 marks ($22.61) (at the works) for export. The home price of sheets is about 112 marks ($26.66), but a few works demand as much as 117 marks ($27.85); the export price is about 98 marks ($23.32) (at works).

It is now admitted that the export trade has grown worse within the past few weeks. It appears, however, that German producers are showing no particular eagerness to take foreign orders at the present low prices; and this is also reported to be the case with Belgian works. Foreign orders have grown lighter, and the further prospects are looked upon as unfavorable. Oversea markets show no disposition to place contracts, and no considerable orders are expected from them for some time to come. It is known that some of those markets still have considerable stocks in hand that have not yet been sold.

Orders for pig iron have been coming in more briskly since the Syndicate began to do business for the second half year. Shipments continue of about the same volume as for previous months. Stocks on hand at the end of May are now given at 757,000 tons, which is an increase of 35,000 tons for the month. The trade in scrap is very quiet, and prices tend to weakness. The railroads are offering large quantities of old rails and other material; and the big iron companies are throwing much scrap on the market. On the other hand, the open-hearth plants are not buying in any considerable quantities, their orders being rather light and they

being engaged in taking stock for the close of their business year.

The specialties of the Steel Works Union have hardly changed within a week. Shipments this month will probably run somewhat higher than previously, as the mills have been hurrying deliveries in order to include the charges in their fiscal year which closes this month. Foreign markets are buying semi-manufactured products in pretty fair quantities and show an inclination to make commitments for 1915, but the mills are not taking such orders yet. In structural shapes both home and foreign buyers are calling for delivery at a fairly satisfactory pace; it is even claimed in some quarters that foreign markets are showing a better demand. Shipments to southern England are going forward at 105s. ($25.55), f.o.b. Antwerp, and to northern England at 102s. ($24.82). The foreign demand for heavy rails has fallen off, but it is hoped that the larger takings of the home railroads and the increased activity in railroad building in the German colonies will counterbalance the reduction in exports to other foreign countries. Sales of light and grooved rails are satisfactory.

The bar trade remains in a demoralized condition; it shows a worse aspect than a month ago. The mills are pretty well employed, but some of them have been cutting prices freely in the export trade. At a recent meeting of the manufacturers of iron bars prices were reduced 5 marks ($1.19), ordinary commercial bars to 133 marks ($31.65), screw stock to 140 marks ($33.32) and horseshoe bars (to dealers) to 153 marks ($36.41). Heavy plates are in an exceedingly unsatisfactory position owing to heavy overproduction. They are now sold by some makers below the price of the slabs from which they are rolled. Of course, only the great establishments that produce their own raw material can keep on at this pace. Steel tubing had further depreciated in price, but sales have been suspended in the hope that a trade combination will be brought into existence soon, a temporary arrangement having already been agreed upon. In wire and wire products there is still much price-cutting.

In the negotiations for organizing the finished steel branches a new situation has been created. The Mannesmann Roehren-Werke of Duesseldorf came forward about the end of last week with the proposal of a new basis on which to form all the organizations. It amounts to an attempt to reconcile the conflicting interests of the companies which have recently been building new mills and those which had been satisfied to keep up their previous producing capacity. It is proposed that two sets of allotments be made—one to constitute the actual production allotments, which would take effect at once; and the other, called by the proposers "capacity allotments," to come into effect only gradually, as the demands of the trade make it possible to absorb larger quantities of products. Of course, these "capacity allotments" would give the new mills a big advantage in any future revival of business. The matter has been taken under consideration by the various branches of the trade, and much interest is shown in it. It is regarded as having materially improved the prospects for completing the trade combinations.

The Mannesmann proposal has already borne fruit in the case of the tubing trade. Several days ago a meeting was hastily called together by telegraph, and an agreement was reached to effect a provisional organization to hold till the middle of August. If by that time the other branches of the finished steel trade shall have been organized, an attempt will be made to give this temporary organization a permanent character. The hopeful, and rather surprising, fact about this meeting is that it was called at the instance of August Thyssen, who, till quite recently, was regarded as the chief obstacle to organizing the tubing trade. Another meeting is to be held today to finish the details of this provisional arrangement.

The Shado-Lite Mfg. Company, Beaver Falls, Pa., has been incorporated with a capital stock of $50,000, to manufacture gas fixtures. F. G. McPherson, W. E. White and J. H. Thompson are the incorporators.

No British Improvement

More Pressure from the Continent on Both Semi-Finished and Finished Steel

(By Cable)

LONDON, ENGLAND, July 8, 1914.

No improvement is yet apparent. Buying remains reserved. Semi-finished steel is weaker, with French and Belgian sheet bars quoted at 74s. ($18) and billets, 71s. ($17.27), f.o.b. Antwerp. Continental finished steel is weaker, and basic bars have been sold at 80s. ($19.46) and less, f.o.b. Antwerp, for November and December shipment. Welsh sheet bars are expected to be reduced to 85s. ($20.68), but in the meantime are nominal, as also are billets and German sheet bars. Stocks of pig iron in Connal's stores are 80,639 gross tons, against 80,925 tons a week ago. The number of blast furnaces in operation in Scotland, Cleveland and Cumberland is 166, against 205 at the corresponding time last year. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 11s. 10½d. ($2.89).

The following prices are per ton of 2240 lb.:

Cleveland pig-iron warrants (Tuesday), 51s. 3d. ($12.47), against 50s. 11½d. ($12.39) a week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 51s. 9d. ($12.59), against 51s. 3d. ($12.47) a week ago.

Hematite pig iron, f.o.b. Tees, 59s. ($14.35).

Sheet bars (Welsh), delivered at works in Swansea Valley, £4 10s. ($21.89).

Steel bars, export, f.o.b. Clyde, £5 15s. ($27.98).

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £5 10s. ($26.76).

Steel ship plates, Scotch, delivered local yards, £5 12s. 6d. ($27.37).

Steel black sheets, No. 28, export, f.o.b. Liverpool, £8 15s. ($42.58).

Steel rails, export, f.o.b. works port, £5 12s. 6d. ($27.37).

The following prices are per export ton of 1015 kilos, equivalent to 2237.669 lb.:

German sheet bars, f.o.b. Antwerp, nominal.

German 2-in. billets, f.o.b. Antwerp, nominal.

German basic steel bars, f.o.b. Antwerp, 80s. to 81s. ($19.46 to $19.70), for both prompt and forward, a reduction of 49c. to 98c.

German joists, f.o.b. Antwerp, £5 2s. to £5 5s. ($24.82 to $25.55).

Freight rates from Antwerp to New York, Boston, Philadelphia and Baltimore, per 1000 kilos (2204 lb.), are about as follows: Billets, blooms and bars, up to 20 ft., 9s. to 10s. ($2.19 to $2.43). Iron and steel sheets, 11s. to 12s. 6d. ($2.68 to $3.04). Beams up to 30 ft., 12s. 6d. ($3.04).

(By Mail)

Not Much of Cheer in the Situation—Watching American and German Developments

LONDON, June 25, 1914.

While not much new is stirring in the iron and steel trades, things are not worse than they were. Indeed, the tone of finished steel is possibly a fraction more settled, and at the extremely low range of prices ruling makers seem to be pretty firm. The production of pig-iron in the Cleveland district remains very restricted, as part of the plan in operation to crush out the warrant stores, and as a result, too, of the artificial upholding of fuel prices. The news that some Alabama foundry iron has been sold for shipment to Hull is not liked, for it is feared that this may be the forerunner of further business. The iron is taken by a radiator company of United States origin, and is of foundry grades. Report has it that another 10,000-ton lot has been sold to Italy, and on the face of it the business appears to be not improbable, but it is not definitely confirmed here and, it is stated, was done direct. American hematite (Bessemer) is now on offer at 61s. ($14.83) c.i.f., Wales. There seems at last some chance of American furnaces taking a hand in

the European pig-iron market, and the result is that much more attention is being paid to what is going on across the Atlantic.

The probability of an early rebate of the existing duty on pig iron imported into Russia is again being canvassed, but this has been a topic of conversation for months. Not long ago it was stated that Germany had sold several hundred thousand tons of pig iron to Russia in anticipation of this, but the news appears to have been premature. Nobody really knows what is happening as regards Russian trade.

Hematite has weakened a good deal. The prices accepted have reflected the needs of the makers to a more than usual degree. As a rule buying is restricted to small lots for early shipment. A little lot of East Coast was sold for shipment to the far East at 60s. 6d. ($14.71) f.o.b., and the same day a 5000-ton lot was done by makers at 58s. 6d. ($14.23) f.o.b., and the latter seemed to think they had done a good deal in closing with the buyer.

While prices of steel cannot fall much further, the tendency is slack all round, and especially for semi-finished steel and finished bars the Continental works are scrambling for business. The tone of the German and Belgian markets generally has certainly retrograded within the past couple of weeks.

The sharp improvement seen in bars was only due to the opening up of negotiations in respect of the extension and prolongation of the Steel Works Union, and now that the early enthusiasm in respect of this has passed and the oversold merchants have covered, the tendency has relaxed and prices are pretty well back again to where they were. It seems, however, as if something would be done to consolidate the German position and it is understood that an entirely new scheme has been drafted for the reconstruction of the Steel Works Union based on allotments of raw steel. Works are to be allotted output on this base, and new raw and finishing plant is not to be permitted to be put up. The question of the allotments of finished products are to be determined on the principle partly of what is termed "possession," that is to say, existing trade, while due regard is also to be had to existing capacity. All questions arising are to be settled not by the works participating but by a commission consisting of technical men, commercial men and accountants.

Metal Market

NEW YORK, N. Y., July 8, 1914.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Spelter	
July	Lake	Electrolytic	Tin, New York	New York	St. Louis	New York	St. Louis
1	13.87½	13.40	31.10	3.90	3.77½	5.00	4.85
2	13.87½	13.50	31.00	3.90	3.77½	5.00	4.85
3	13.87½	13.50	31.70	3.90	3.75	5.00	4.85
6	13.87½	13.62½	32.20	3.90	3.75	5.00	4.85
7	14.00	13.75	32.00	3.90	3.75	5.00	4.85

Copper is higher as a result of export buying. Under a good movement tin has advanced. Lead continues dull and is weaker in the West. Spelter is unchanged. Interest in anitmony is indifferent.

New York

Copper.—Taking advantage of the low prices which prevailed last week European buyers bought heavily of electrolytic, the final estimates placing the amount taken at 40,000,000 to 50,000,000 lb. Domestic buyers did not take hold to any great extent, which was a disappointment to the trade. Most of the buying was at prices ranging from 13.37½c. to 13.50c., but on the strength of the activity prices advanced gradually until yesterday, when 13.75c., cash, New York, or 13.87½c., delivered, 30 days, was quoted for electrolytic. The market is now strong enough to cause predictions that it will go higher, though it is admitted that this will follow another flurry in buying. A detrimental feature is that the brass mills are not nearly as active as they should be and most of them are not inclined to buy until they have to. On the rise referred to, copper in second hands which had been freely offered at the low prices has been withdrawn. The June statistics of the Copper Producers' Association will be issued to-day. Prime Lake copper is held at 14c., most of the metal which was offered at 13.87½c. having been absorbed. The London quotations to-day are £62 6s. 3d. for spot and £62 13s. 9d. for futures. The exports this month total 6403 tons.

Copper Averages.—The Waterbury average for the month of June was 14.37½c. The average New York price for Lake, based on daily quotations in *The Iron Age*, was 14.12c., and for electrolytic, 13.80c.

Tin.—In the first three days of this month a good business was done in both prompt and future deliveries and the market to-day has a much more optimistic tone than has prevailed in recent weeks. The buying here caused London to advance, the morning cable on Monday being £4 higher. The quotation in New York yesterday was 32c. and the trade is hoping that the downward tendency has been effectively reversed. In the three days prior to the holiday, at least 600 tons was bought and possibly the amount may run up to 1000 tons. Both speculators and consumers had a hand in the buying. This week has been quiet. London is quoted to-day at £144 15s. for spot and £146 5s. for futures. The arrivals total 1509 tons and there is afloat 1450 tons.

Lead.—This market has not shared in the betterment which is observed in copper and tin, but on the contrary, the extreme dullness has caused softness in the West and 3.75c., St. Louis, is now quoted in place of 3.77½c. At the price now quoted in the West, independents can undersell the large interest at all points except New York. The export business has been rather good and has served to hold the market up here. The New York price continues at 3.90c.

Spelter.—Consumers seem to have ignored spelter and there is very little business at quoted prices—5c., New York, and 4.85c., St. Louis. One good phase of the situation is the announcement of the settlement of the wage question between the sheet mills and their employees for the settlement is expected to give an impetus to purchasing.

Antimony.—No change of any kind is reported. Quotations are 7c. for Cookson's, 6.75c. for Hallett's and 5.40c. to 6c. for other grades.

Old Metals.—Business is dull but quotations are firmer. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible	13.00 to 13.25
Copper, heavy and wire	12.50 to 12.75
Copper, light and bottoms	11.50 to 11.75
Brass, heavy	8.50 to 8.75
Brass, light	7.00 to 7.25
Heavy machine composition	11.50 to 12.00
Clean brass turnings	8.50 to 8.75
Composition turnings	9.75 to 10.25
Lead, heavy	3.70
Lead, tea	3.40
Zinc scrap	3.85

St. Louis

JULY 6.—The market in Missouri products has drooped slightly but steadily. Final prices were as follows: Lead, 3.77½c.; spelter, 4.85c.; tin, 31.85c. to 31.95c.; Lake copper, 14.25c.; electrolytic copper, 13.85c. to 13.97½c.; Cookson's antimony, 7.47½c. to 7.60c. Joplin ore showed some weakness, and prices were generally $1 lower. The basis range for 60 per cent. zinc ore was $40 per ton down to $37, with the choicest ores reaching as high as $43. Calamine was also weak at $21 to $23 for 40 per cent., with the choicest ores reaching $27. Lead ore was rather dull, with 80 per cent. held at $46. In a general way the whole market showed the effects of the holiday period. A better feeling is looked for early in the month. Miscellaneous scrap metals are quoted as follows: Light brass, 5.50c.; heavy yellow brass, 7.50c.; heavy red brass and light copper, 9.50c.; heavy copper and copper wire, 10.50c.; zinc, 3c.; lead, 3.25c.; pewter, 21c.; tinfoil, 25c.; tea lead, 3c.

The June report of the Copper Producers' Association, issued Wednesday, shows that the stock of marketable copper on hand July 1 was 21,768,022 lb. greater than on June 1.

Iron and Industrial Stocks

NEW YORK, July 8, 1914.

The past week has witnessed another comparatively dull period on the stock exchanges. Prices, however, ruled quite firm with a slightly advancing tendency, influenced by what are regarded as favorable developments. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Am. Can, com...	26¼- 28¾	Pressed St'l, com.	42½- 43½
Am. Can, pref...	90½- 91¾	Ry. Spring, com.	27½- 27¾
Am. Car & Fdy., com.	50¾- 51⅞	Ry. Spring, pref.	93¼
Am. Car & Fdy., pref.	116¾-117¼	Republic, com...	22⅝- 23
Am. Loco., com..	31 - 32	Republic, pref.	85½
Am. Loco., pref..	98¼-100	Rumely Co., com.	11
Am. Steel Fdries.	31 - 31⅛	Rumely Co., pref.	27¼- 28½
Bald. Loco., com.	46½- 46⅞	U. S. Steel, com.	60¾- 62½
Bald. Loco., pref.	106⅜-107½	U. S. Steel, pref..	109 -109½
Beth. Steel, com.	41¼- 42¾	West'gh'se Elec..	73½- 76½
Case (J. I.), pref.	85½	Am. Ship, com.	33⅛
Colorado Fuel...	26 - 26¼	Chic. Pneu. Tool.	54
Deere & Co., pref.	94	Cambria Steel...	47¾- 48½
General Electric.	148 -149½	Lake Sup. Corp..	15⅞- 17
Gt. N. Ore Cert..	31¼- 32⅛	Cruc. Steel, com.	15¾- 15⅞
Int. Harv., com..	106½-107	Cruc. Steel, pref.	89⅞- 92
Int. Harv., Corp.	104	Harb. Wk. Ref., pref.	99
Pittsb'gh St'l, pref.	87	La Belle Iron, com.	28 - 29

Dividends Declared

The Harbison-Walker Refractories Company, regular quarterly, 1½ per cent. on the preferred stock, payable July 20.

The General Fireproofing Company, regular quarterly 1¾ per cent. each on the preferred and common stock, payable July 1.

The Combustion Engineering Corporation, owner and manufacturer of the American stoker and the Grieve grate, reports its Pittsburgh factory operating double time, employing night and day shifts. The factory will be operated on this basis for an indefinite period to enable the company to keep up with the steady and increasing demand for the type E stoker. Vice-president George E. Learnard attributes this satisfactory condition partly to the company's splendid selling organization, which embraces men competent to decide on the character of equipment needed in a plant, but more especially to the merit of the product. The type E is the high-duty stoker for large public service stations and the larger factories. It will permit of installations in old settings without much change to the furnace. It has a special dumping arrangement that makes the work of the fireman easy. It has air-cooled grates that cut repairs to such a low figure that the company is prepared to insure the upkeep for a specified premium. The Combustion Engineering Corporation has its main office at 11 Broadway, New York City, with branches in Philadelphia, Chicago, Salt Lake City, Pittsburgh, Hazelton, Pa., and London, England.

President George G. Crawford states that the Tennessee Coal, Iron & Railroad Company will begin work immediately on a number of improvements. At its Bessemer rolling mills the 8-in. guide mill will be equipped with a continuous heating furnace for securing greater uniformity in heating steel and for securing a reduction in the cost of heating steel; hot beds will be installed to cool the material in such a way that it will be straighter, which will improve the quality of the products, as well as enable the mill to operate more economically, and continuously. The most important improvement will be the discarding of the steam engines which drive the rolls on this mill, substituting therefore electric motor drives.

The Brown & Sharpe Mfg. Company, Providence, R. I., announces that its works will be closed from August 1 to 17 for the annual vacation. During that time the offices will be open as usual and orders for machine tools, machinists' tools and cutters will receive the same attention as at any other period of the year.

The E. A. Lueck Company, Sycamore street, Milwaukee, Wis., manufacturer of steel, copper, brass and other metal stampings, has changed its name to the Lueck Mfg. Company.

Germany's Exports for Five Months

After having created a new record in April, Germany's exports of iron and steel registered a heavy decline in May. The total for the month was only 467,460 metric tons, which compares with 636,650 tons in April, and 550,600 tons in May, 1913. The net excess of exports over imports was 412,500 tons, or the lowest for more than two years. The following table gives a comparison of the exports of the principal classes for May and for five months of the past two years in metric tons:

	May		January-May	
	1913	1914	1913	1914
Pig iron	79,538	57,245	401,754	303,042
Scrap	16,905	13,317	92,616	76,308
Semi-finished steel	55,265	49,419	280,563	308,619
Beams	44,284	28,847	206,772	153,179
Other structural shapes	89,824	84,805	446,863	527,253
Heavy plates	40,480	37,742	183,636	202,349
Thin plates	11,744	8,240	61,971	63,053
Wire, rolled or drawn, plain	23,661	16,126	119,863	118,542
Wire, polished	13,300	9,464	73,582	78,138
Wire nails	4,443	5,714	27,643	31,320
Tubing	16,949	12,114	82,331	69,942
Steel rails	50,064	41,700	212,149	225,930
Steel railroad ties	14,265	16,268	56,518	76,801

Mining Districts of Minnesota

The Experiment Station of the School of Mines of the University of Minnesota has just issued a set of blue printed maps which cover completely the various mining districts of Minnesota. There are 13 maps in the set, one showing in general the iron ranges of the State; six are devoted to details of the Mesabi range, two to the Vermillion range and three to the Cuyuna range with space devoted to a list of the mine ownerships. The compilation is attractively presented and is a valuable contribution.

The H. W. Johns-Manville Company, Madison avenue and Forty-first street, New York, has issued a booklet describing the J-M system for cooling and distributing drinking water in manufacturing establishments. The water is cooled to the right temperature by a refrigerating machine and is then piped to bubbler fountains placed at advantageous locations throughout the plant. The refrigerating vapor in this machine is sulphur dioxide. The process employed does away with the offensive and corrosive gases usually found in connection with refrigerating apparatus. A thermostat connection is arranged to start and stop the machine at certain temperature limits, thus automatically keeping the water at a uniform temperature.

The Seaboard Air Line has ordered 20 and the Chicago, Milwaukee & St. Paul 5 mikado type locomotives from the American Locomotive Company. The Chicago Junction is reported to be in the market for 5 switching; the Minneapolis & St. Paul for 20 mikado type, and the Kansas City Southern for 30 locomotives, while the Western Maryland is said to have revived a former inquiry for 20 freight locomotives.

The output of iron ore in 1913 from the Krivoi Rog and Crimean districts in South Russia was 6,120,000 and 450,000 tons respectively, the total, 6,570,000 tons, being about 800,000 tons more than that for 1912. It is important to note that this ore is being absorbed more and more by the iron industry of Russia, over 90 per cent. of the 1913 output being thus taken.

The La Belle Iron Works, Steubenville, Ohio, has awarded a contract to the Blaw Construction Company, Pittsburgh, for the erection of a structural steel shed over a portion of the yard at its Wheeling works, Wheeling, W. Va., to be used for handling and shearing material. The dimensions will be 250 x 58 x 35 ft.

The city of Cleveland, Ohio, has placed contracts with the Babcock & Wilcox Company for two 250-hp. Sterling boilers and with the Detroit Stoker Company for two stokers, coal bunkers and ash-handling equipment.

American Society for Testing Materials

(*Continued from page 97*)

the increasing use of scrap in making gray-iron castings which has resulted in raising the sulphur content due to constant melting of this material. The time was coming, he thought, when the sulphur limit will either have to be raised or this item stricken out altogether. It is increasingly difficult to adhere to specifications and a method of desulphurizing cast iron would be welcome.

As to specifications for malleable castings Dr. Moldenke stated that the committee had not completed its revised specifications. The conditions to be met have changed considerably in recent years in the malleable business in that large castings are now made in steel that used to be made in malleable. Because of this the tendency in foundries is to operate for light casting work only, necessitating all the more attention in the revision of the standard specifications, as particularly in railroad work there may be life at stake. For this reason the duly prepared specifications for malleable castings are still in the hands of the sub-committee for a further study of the situation.

Dr. Moldenke then gave an interesting account of the trip of Walter Wood and himself to Europe as American representatives of the International Committee on Cast Iron and Cast Iron products, with special reference to international specifications for pig iron, cast iron pipe and on an international test bar, all intended for export use only. The results of this trip and the progress of the negotiations were covered in *The Iron Age* for July 2.

POURING CAST IRON TEST BARS

Some interesting remarks were offered on the subject of the cast-iron test bar; the method of pouring this, as laid down in the proposed international specifications, calling for a top pour. Dr. Leonard Waldo, consulting engineer, New York, stated that his observation was to the effect that top pouring does not produce as homogeneous a bar as bottom pouring. Dr. Moldenke replied to this that if test bars are poured flat and then tested, a difference of 200 lb. in strength was found between the top and the bottom of each side. Similar non-homogeneity resulted from bottom pouring.

Thomas D. West, Cleveland, Ohio, favored top pouring entirely even for large castings, while Walter Wood, of Philadelphia, reinforced these statements by testifying that 95 per cent. of all cast-iron pipe, 13 to 14 ft. long, are all top poured. S. V. Hunnings, chemist and engineer of tests, American Locomotive Company, Schenectady, N. Y., remarked that his company were successfully top-pouring thousands of bars a year.

J. E. Johnson, Jr., New York City, in regard to cast-iron specifications in general, said that he felt it was a pity that they are usually so indefinite, and that much that has been found out does not appear in them. He thought some account of these accomplishments ought to be taken. He did not think that the question of fracture should be entirely ignored for much could be told by it, and all dependence should not be placed on analysis, for irons of the same ordinary analysis often differed in fracture and also decidedly in strength.

E. B. Tilt, Canadian Pacific Railroad, presented a paper on "Some Notes on Chilled Cast Iron" stating that the principal reason prompting the paper was that chilled iron is an interesting subject because 6000 tons a day are cast into car wheels.

The object of the paper, he said, is to solve a metallurgical problem of how to make white cast iron stronger and better wearing for car wheels. Illustrations are given of the dangerous defects and of several other common troubles of the cast-iron wheel. The two main opinions with reference to wheel-iron mixtures are stated, together with representative compositions, as well as a typical wheel analysis of the present-day steel mixture.

Brief consideration is given to the two different materials which form a wheel flange and results of drop tests on gray iron and on white iron of different compositions are indicated. The effect of annealing chilled iron is given, as is also the increased strength of white iron when hot. Reference is made to extended data on wheel-foundry practice, as shown by the daily test bars. Results are shown of drop tests on part chilled bars and also of drop tests on the flange of wheels. The possibility of producing a low-expansion iron under brake service is suggested.

A summary is given of the tests of wheel-iron mixtures, which includes different materials. The experiments to date indicate that no combination of pig iron and scrap is an improvement on the standard wheel mixture which contains scrap steel.

In a brief discussion Mr. West stated that it is recognized that an uneven depth of chill in wheels is detrimental to their life, and that there have been and are many wheels produced with uneven chill. He read a statement by the late Dr. Dudley that an experience of 25 to 30 years revealed that 70 per cent. of all broken wheels show a variation in chill of from $\frac{1}{8}$ to $\frac{1}{4}$ in. in the tread.

J. E. Johnson, Jr., remarked that the Chicago, Milwaukee & St. Paul Railroad is getting from 85,000 to 95,000 miles of service per wheel from those it makes in its own foundry, whereas from those they buy, 35,000 to 45,000 miles per wheel is the best. This is accomplished by great care in purchasing and selecting the iron. Charcoal iron is bought at $40 per ton, but in melting great care is exercised that scrap from other makes of wheels is not introduced. The inspection is also severe.

The question as to whether chemical analysis, cupola practice and annealing were not more important in producing a good product than the iron, whether it be charcoal or coke, was raised but was refuted by Mr. Johnson, who stated that poor castings made from charcoal iron were always attributable to a poor charcoal iron itself, some having been made that was poor due to inferior chemical charcoal.

A paper on "A New Vibratory Testing Machine and Results Obtained by Its Use," by S. V. Hunnings, chemist and engineer of tests, American Locomotive Company, was presented by the author. Owing to the lateness of the hour, a discussion of it was precluded.

S. V. Hunnings presented the report of committee A-2 on standard specifications for wrought iron as did also S. W. Parr for committee E-4 on methods for sampling and analysis of coal, it being the committee's first report to the society.

The Temple Iron Company, operating a blast furnace at Temple, Pa., has been reorganized with a capital stock of $4,000,000, consisting of $2,000,000 8 per cent. preferred, and $2,000,000 common. In addition, 5 per cent. bonds amounting to $2,500,000 will be issued. S. B. Thorne will be president of the company, and the headquarters will either be in New York City or Scranton. The reorganization is being effected at the offices of Thorne, Neale & Co., 1 Broadway, New York City.

STEEL SCHEDULE 1914 CENSUS

Official Schedule for the Steel Industry—Criticisms and Suggestions Asked

WASHINGTON, D. C., July 7, 1914.—The Director of the Census, after a series of conferences with the officials of the American Iron and Steel Institute and the representatives of a number of the largest producers of iron and steel products, has approved the official schedule upon which will be made the returns of steel works and rolling mills for the manufacturing census of 1914. These schedules will be supplied to all producers in the industry on or before December 1 and manufacturers will be expected to fill them out and return them to the bureau not later than January 15, 1915. As the Director of the Census is desirous of securing the co-operation of the entire industry in making this the most accurate census of iron and steel products thus far obtained, he will be glad to have the managers of steel works and rolling mills examine this schedule with care and forward to him any suggestions concerning additions or amendments that may appear desirable. The final print of the schedules will be delayed a reasonable length of time after this publication to enable interested parties to go over the proposed schedule and to notify the bureau of any desired changes.

In preparing this schedule, which has been framed under the direct supervision of William M. Steuart, chief statistician for manufactures, every effort has been made to meet the views of the trade regarding classification, the separation of products according as they are sold, consumed in re-manufacture, or transferred to other plants, and in general to furnish a broad basis for an accurate and up-to-date census of the most important American industry.

Under the heading of "products" the bureau has provided two general classifications, namely, quantities manufactured for consumption in works or for interplant transfer and those produced for sale. In stating the value of these products, provision is made for a return of the amount actually received for the goods when sold and for the assigned value of all products which are subjected to interplant transfers. No attempt is made to secure the value of products "consumed in the works," as this would involve a duplication, in view of the fact that products so consumed subsequently reappear either in the form of products for sale or for interplant transfer.

The special schedules upon which detailed returns of industries are to be made are technically known as "supplemental" schedules, for the reason that they supplement the general schedule sent to each manufacturer and upon which returns are made of capital employed, number of officers and employees, amount of salaries and wages paid, etc. The text of the supplemental schedule covering steel works and rolling mills is as follows:

[The schedule, as prepared by the Census Bureau, is of full letter sheet size, with ample space for filling in the data required. The columns for quantities and values are wide. It seems necessary to make this explanation, as otherwise the reproduction herewith given may be misunderstood. It was necessary to narrow the columns to fit our space.—EDITOR.]

Department of Commerce—Bureau of the Census

STEEL WORKS AND ROLLING MILLS, 1914

Supplemental Schedule

Name of establishment .....

Name of owner or lessee .....

Location of works { State ..... County ..... / Post-office ..... Street and No. .....

(Establishments operating blast furnaces, steel works and rolling mills, tin-plate and terne-plate works, or wire mills as departments of one establishment, should make separate reports for each department in the General and the respective supplemental schedules, reporting in the Supplemental Schedule for administrative and general offices the capital, employees, and expenses not assignable to any of the plants.)

1. Materials used: Give the quantity (tons of 2,240 lb.) and cost of the principal materials used during the year as indicated.

The total cost of all materials should appear only in the General Schedule.

Kind	Department or interplant transfers		Purchased		Total Cost
	Tons	Assigned cost	Tons	Cost	
Pig iron		$		$	$
Spiegeleisen, ferromanganese and all other ferroalloys		$		$	$
Iron and steel skelp		$		$	$
Iron and steel wire rods		$		$	$
Scrap iron or steel, including old rails not intended for rerolling		$		$	$
Scrap made and consumed in works reporting		(000)	(000)	(000)	(000)
Iron or steel ingots, blooms, billets, slabs, muckbar, scrap bar, rerolling rails and sheet and tin-plate bars		$		$	$
Copper,—ingots, billets, blooms, bars, scrap, etc		$		$	$
Domestic iron ore		$		$	$
Foreign iron ore (from outside the United States)		$		$	$

2. Products: Give the quantity (tons of 2,240 lb., unless otherwise indicated) and selling value or price at the works and account for all products and by-products manufactured during the year by this department (whether sold or not).

The total value of products in the schedule must agree with the total in the General Schedule.

Kind	Production—tons			Output of works—value	
	For consumption		For sale	Interplant transfers (Assigned volume)	Produced for sale
	Consumed in works	Interplant transfers			
1. Steel ingots:					
Open hearth—					
Basic				$	$
Acid				$	$
Bessemer, including all converters				$	$
Crucible				$	$
Electric or electrically refined				$	$
All other				$	$
2. Direct steel castings:					
Open hearth—					
Basic				$	$
Acid				$	$
Bessemer, including all converters				$	$
Crucible				$	$
Electric or electrically refined				$	$
All other					
3. Blooms, billets and slabs, steel				$	$
4. Rolled blooms and billets for forging purposes				$	$
5. Hammered charcoal blooms, billets, and slabs				$	$
6. Sheet and tin-plate bars				$	$
7. Muck and scrap bar				$	$
8. Skelp, including flue and pipe—iron and steel				$	$
9. Wire rods, iron or steel (and including chain rods, spike rods, etc.)				$	$
10. Plates and sheets (not including black plates or sheets for tinning, nail and tack plates, tie plates, fish plates or armor plates):					
No. 12 and thicker				$	$
No. 13 and thinner				$	$
Included above—					
Steel—					
Plates				$	$
Sheets				$	$
Iron				$	$
11. Black plates (or sheets) for tinning:					
Steel				$	$
Iron				$	$
12. Nail and tack plates				$	$
13. Rails:					
Open-hearth steel—					
Basic				$	$
Acid				$	$
Bessemer steel				$	$
Iron				$	$
14. Rerolled or renewed rails (not including rails rolled by makers of ingots from new seconds, defective new rails, crop ends, etc.)				$	$
15. Rail fastenings, including splice bars and other rail joints, tie plates, fish plates, etc				$	$

Kind	Production—tons: For consumption: Consumed in works	Production—tons: For consumption: Interplant transfers	Production—tons: For sale	Output of works—value: Interplant transfers (Assigned volume)	Output of works—value: Produced for sale
16. Structural shapes, both heavy and light (not including bars for reinforced concrete work and plates used for making girders)					
Steel				$	$
Iron				$	$
17. Bars and rods (not including wire rods, sheet and tinplate bars, splice bars and bars for reinforced concrete.)					
Steel				$	$
Iron				$	$
18. Bars for reinforced concrete				$	$
19. Hoops, bands and cotton-ties				$	$
20. Axes, rolled or forged:					
Car and locomotive				$	$
Automobile, wagon, carriage, and all other				$	$
21. Car and locomotive wheels, rolled or forged				$	$
22. Armor plates, gun forgings and ordnance				$	$
23. All ROLLED iron and steel products not otherwise enumerated				$	$
24. All forged, cast or other iron and steel products not otherwise enumerated				$	$
25. Scrap iron or steel				$	$
26. Copper rods, net tons				$	$
Total assigned value for interplant transfers				$	

	Quantity		
27. Galvanized plates or sheets, Tons			$
28. Bolts, nuts, rivets, washers, etc.: Kegs, 200 lb. Number			$
29. Pipes and tubes:			
Wrought welded, Tons			$
Seamless, hot-finished or cold-drawn, Tons			$
Cast-iron pipe and fittings—			
Bell and spigot, Tons			$
Flanged, Tons			$
Fittings, Tons			$
All other, including cinched, riveted, etc., Tons			$
30. Nails and spikes (not including WIRE nails or WIRE tacks):			
Cut, Kegs, 100 lb. Number			$
Railroad spikes, Kegs, 100 lb. Number			$
Other forged, Kegs, 100 lb. Number			$
All other (including tacks)			$
31. Horse and mule shoes, Kegs, 200 lb. Number			$
32. Switches, frogs, crossings, etc., Tons			$
33. Tin plate and terne plate (not to be included in this schedule but reported as a separate department and in detail on the supplemental schedule for tin and terne plate)	XXXX		XXXX
34. Wire and wire products, wire nails, etc. (total value of products of wire department, details to be reported in supplemental schedule for wire)	XXX		$
35. Cast-iron car and locomotive wheels, Tons			$
36. Gray iron and malleable iron, air-furnaces, semi steel, and all castings other than steel castings, cast-iron pipe, car and locomotive wheels, Tons			$
37. Springs:			
Car			$
Furniture and all other, except wire springs			$
38. Stamped ware (not including tinned stamped ware reported in supplemental schedule for tin and terne plate)			
39. Cars:			
Steel passenger, Number			$
Steel freight and industrial, Number			$
Other cars, Number			$
40. Machinery, etc.			$
41. Shovels, spades, scoops, etc.			$
42. Copperas (pounds and value)			$
43. All products other than iron or steel made in this establishment not otherwise provided for			$
Amount received for custom work and repairing			$
Value of interplant transfers			$
Total			$

DUPLEX STEEL.—made from metal partly finished in Bessemer converters (tonnage heretofore included).
Basic open-hearth, tons....., acid, open-hearth, tons.....

ALLOY STEEL (tonnage heretofore included).

Kind	Specify alloy and tons of each: Nickel, tungsten, titanium, vanadium, nickelchrome, etc.	Total tons: Ingots	Total tons: Castings
Basic open-hearth			
Acid open-hearth			
Bessemer			
Crucible, electric or other steel			
Total alloy steel, ingots or castings			

Alloy rails, included in item 13, kind ..... Tons.....

3. Furnaces, etc.
Converters: Number, kind and capacity. (State whether standard Bessemer, Tropenas, Robert-Bessemer, Bookwalter, Zenzes, Wills, special Bessemer, side-blown Bessemer, Schwartz, etc.)

Kind	Number of converters	Capacity of each per blow (Tons)	Total daily steel capacity, double turn (Tons)

Converters used for partly purifying metal for open-hearth furnaces (included above).
Number ..... Daily capacity on double turn ..... Tons .....

Open-hearth steel furnaces:

Kind	Number	Capacity of each per heat or melt. Tons	Average number of heats per furnace per week	Total daily steel capacity, double turn. Tons
Basic furnaces				
Acid furnaces				

Crucible steel furnaces:

Number of melting furnaces	Number of pots per furnace	Total number of pots that can be used at a heat	Total daily steel capacity, double turn. Tons

Other steel furnaces (blister or cemented), German, and miscellaneous:
Number of cementing, converting, or other furnaces .....
Kind ..... Total daily capacity of steel, double turn, tons .....
(Specify)

Metal mixers: Number ..... ; Capacity of each .....

4. Remarks: .....

Two Wheeling Interests to Consolidate

The directors of the Wheeling Steel & Iron Company, by unanimous vote at a meeting held in Wheeling, W. Va., July 1, approved of a plan to absorb the new Wheeling Sheet & Tin Plate Company by purchase. C. R. Hubbard, who for many years has been at the head of the Wheeling Steel & Iron Company, will retire from active management and will be succeeded by Isaac M. Scott, president of the Wheeling Sheet & Tin Plate Company and former president of the La Belle Iron Works. Mr. Hubbard will remain with the company in an advisory capacity.

The matter will be passed upon by the stockholders of the Wheeling Sheet & Tin Plate Company, at a meeting to be held later in the month. The directors have already tentatively approved of the plan.

The Wheeling Steel & Iron Company has a capitalization of $5,000,000, and it is proposed to issue additional stock to the amount of $2,500,000, thus increasing the total capitalization to $7,500,000. The Wheeling Sheet & Tin Plate Company is capitalized at $1,000,000.

The Schultz Bronze Company is a new enterprise located at 34 Beach street, Boston, Mass. The president of this company is Lewis Rodman Schultz, formerly general manager of the Pittsburgh Architects' Bronze Works, and associated with him is Hans Fritz Muschler, formerly with Delaunay, Paris. The company imports French models and deals in ecclesiastical and art bronze work, makes fac-simile bronze reproductions from hand chased models of bas-reliefs, appliques, panneaux and moulures in galvanoplastie massive, and specializes in sectional nickel-plated copper molds.

L. Vogelstein & Co., 42 Broadway, New York, furnish the following figures of German consumption of foreign copper for the months January to May, 1914: Imports, 99,788 tons; exports, 2,969 tons; consumption, 96,819. This compares with consumption in the same period of 1913 of 90,567 tons. Of the quantity imported 87,684 tons came from the United States.

Customs Decisions

Machines for Shaping Asbestos

The Board of United States General Appraisers has decided that machines which shape into various forms, for fittings in electrical work, asbestos and other insulating substances, are not to be regarded under the tariff act of 1909 as machine tools as that term is used in the law. W. J. Longmore, Pittsburgh, the importer of the machines, objected to the collector's classification as manufactures of metal with duty at 45 per cent., and went before the customs tribunal with a claim for duty at only 30 per cent. The board overruled the protest, as no evidence was offered to show that the machines are employed in metal-cutting operations, or that they can be so used. The Boye Needle Company, Chicago, also failed in a contention for the entry of needle polishing machines as machine tools.

Chain-Making Machines Are Machine Tools

Another firm, Alfred H. Post & Co., Inc., Philadelphia, was more successful before the board. In this case the machines were for making chains. Duty at 45 per cent. was taken under the act of 1909, and the usual claim filed for assessment at 30 per cent. as machine tools. The testimony showed that these machines are capable of taking a bar of iron and by its various operations transforming it into a completed chain, ready for welding. Judge Fischer holds that, being driven by power other than hand, they have all of the requisites of machine tools as that term has been judicially and commercially interpreted. The protests are accordingly sustained and reliquidation ordered. Accompanying the machines are dies used to produce different sizes of chain links. The dies, the board holds, must stand the 45 per cent. duty assessed. The same firm imported drill-testing machines and file-testing machines. The board held that the first-named are machine tools, while the file apparatus was properly classified as manufactures of metal. The Grand Crossing Tack Company, Chicago, was sustained in a contention, for the classification as machine tools, of machines designed for making roofing nails, the collector's assessment of 45 per cent. being reversed.

Searchlight Gas in Demand

The Searchlight Company, with general offices in the Karpen Building, Chicago, manufacturer of acetylene gas for automobile lighting and for oxy-acetylene welding, cutting and brazing, despite the business depression which has existed in certain lines this year, reports a substantial increase in sales each month in 1914 as compared with 1913; in fact, June of this year is running 50 per cent. ahead of June, 1913. The company is now asking for bids on the erection of a new manufacturing plant adjoining its gas plant at Thirty-first street and Homan avenue, Chicago, as well as for a garage for its delivery trucks and automobiles. When this building is completed, the manufacturing end of the business will be entirely handled at Chicago, the principal headquarters of the company.

The growth of the business is attributed to the fact that the use of acetylene for industrial and oxy-acetylene welding purposes is growing very rapidly. In spite of the invasion of electric lighting on automobiles, the company is finding the demand for its products in this field even greater than in 1913. The Searchlight system of storing acetylene gas for industrial and welding purposes claims marked advantages, due to the use of a highly absorbent packing inside of the cylinder instead of asbestos. It is claimed that the Searchlight packing absorbs 20 per cent. more gas in a given cylinder at a given temperature and pressure than usual methods of storing. Fifteen Searchlight plants and offices in the principal centers of population are in operation for the exchange of the company's cylinders for both lighting and industrial uses. New requirements are constantly being developed for compressed acetylene in cylinders, and some of the largest users of acetylene for oxy-acetylene welding are using exclusively Searchlight cylinders on their work.

PERSONAL

Charles F. Rand was tendered a luncheon at the Downtown Club, New York, July 2, by Dr. Albert R. Ledoux, in honor of the presentation to Mr. Rand by the King of Spain of the Order of Isabella in recognition of his humanitarian and other services in Cuba during the Spanish-American war. Among those present were Dr. Ledoux, Dr. George F. Kunz, Dr. John Hays Hammond, Dr. William L. Saunders, Prof. James F. Kemp, Walter R. Ingalls, Benjamin B. Lawrence, Bradley Stoughton and E. Gybbon Spillsbury.

Frank B. Baird, president Buffalo-Union Furnace Company, Buffalo, N. Y., has returned from Europe.

F. A. Assman, chairman of the board of directors of the Continental Can Company, sailed Tuesday on the Vaterland for a five weeks' trip in Europe.

Albrecht F. Leue has resigned his position as purchasing agent of the Triumph Electric Company, intending to enter upon the practice of law August 1, with offices in the Mercantile Library Building, Cincinnati, Ohio.

Walter Edgar, Commercial Trust Building, Philadelphia, has been appointed representative of the Buffalo Copper & Brass Rolling Mill, Buffalo, N. Y.

C. A. Williams, formerly a melter in the No. 2 open-hearth department of the South works of the Illinois Steel Company, has accepted a position as open-hearth superintendent for the Tata Iron & Steel Company, Ltd., Sakchi, Bihar, India.

Harry J. Marks, manager of the New York office of the American Engine & Electric Company, has been appointed sales manager. In the future he will divide his time between the New York office at 90 West street and the factory at Bound Brook, N. J.

Frederick Allart, of the New York office of the Lukens Iron & Steel Company, sailed July 7 on the Mauretania for a brief sojourn in Europe.

Windsor T. White, president of the White Company, Cleveland, Ohio, has been elected president of the White Sewing Machine Company in that city to fill the vacancy caused by the death of his father, Thomas H. White. W. W. Chase has been elected first vice-president, retaining his present office as secretary, and Walter C. White has been elected second vice-president.

John C. Neale, with Carnegie Steel Company, has resigned, effective July 15, and becomes president and general manager of the new Central Steel Company, Massillon, Ohio.

OBITUARY

SAMUEL J. BROWNE, manager of the Wheeling Corrugating Company, Wheeling, W. Va., died suddenly last week of acute indigestion, aged 60 years. With the exception of a year's residence in Steubenville, Ohio, he had lived in Wheeling all his life. He had been connected with the Wheeling Corrugating Company for 20 years. He leaves a widow and three daughters.

ARTHUR M. PARKER, secretary and treasurer of the Detroit Range Boiler Company, Detroit, Mich., died June 26, aged 54 years. He was a director of several Detroit corporations and a prominent clubman.

The Western Reserve Steel Company, Warren, Ohio, corrects the names of its officers as printed in *The Iron Age* of June 25. C. S. Thomas is mentioned as president; this should be C. G. Thomas. A. I. Thomas is named as vice-president, and should be I. A. Thomas. Attention is called to this because C. S. Thomas is vice-president of the Deforest Sheet & Tinplate Company, and the coupling of his name with the Western Reserve Company causes some confusion.

Amending the Clayton Anti-Trust Bill

WASHINGTON, D. C., July 7, 1914.—The Senate Judiciary Committee, which for a full month has had under consideration the Clayton anti-trust bill, has reached a tentative agreement with regard to the provisions of sections 7 and 18 which, as passed by the House, exempted labor organizations from the operation of the anti-trust laws and legalized a lengthy and important category of acts commonly committed by strikers and their sympathizers in pursuance of labor disputes. It is to be regretted that the Senate Committee has not decided to strike these two sections from the House bill; nevertheless, the compromise provisions which have been adopted will be far more satisfactory to employers than were those of the original measure and no doubt will be correspondingly distasteful to the leaders of organized labor who are holding the lash of the "labor vote" over the weak-kneed members of both houses.

Section 7 of the Clayton bill as agreed to by the Senate Judiciary Committee is amended as follows, the words stricken out of the House bill being inclosed in brackets and the new language inserted by the Senate Committee being in italics:

Sec. 7. That nothing contained in the anti-trust laws shall be construed to forbid the existence [and operation] of fraternal, labor, consumers, agricultural, or horticultural organizations, orders, or associations instituted for the purposes of mutual help, and not having capital stock or conducted for profit, or to forbid or restrain individual members of such organizations, orders, or associations from *lawfully* carrying out the legitimate objects thereof; nor shall such organizations, orders, or associations, or the members thereof, be held or construed to be illegal combinations or conspiracies in restraint of trade, under the anti-trust laws.

It will be noted that the exemption of labor and other specified organizations in the section amended is limited to their existence and not to their operation, an important change which would permit labor unions to be prosecuted and punished under the anti-trust laws, if not actually dissolved. The insertion of the word "lawfully" later on in the section also limits the exemption from restraint under the anti-trust laws to acts otherwise legal, committed in carrying out the legitimate objects of the organization. The labor leaders will no doubt denounce the section as amended by the Senate Judiciary Committee on the ground that the two changes noted have completely emasculated it.

The amendments to section 18 are even more important. This provision relates to injunctions in labor disputes and as passed by the House prohibited the issuing of restraining orders or injunctions to prevent or to stop numerous actions commonly resorted to by organized workmen in furtherance of strikes. The section as amended is as follows, the words included in brackets being stricken out, while the new language is in italics:

And no such restraining order or injunction shall prohibit any person or persons, *whether singly or in concert*, from terminating any relation of employment, or from ceasing to perform any work or labor, or from recommending, advising or persuading others by peaceful means so to do; [or from attending at or near a house or place where any person resides or works, or carries on business or happens to be, for the purpose of peacefully obtaining or communicating information] or of peacefully persuading any person to work or to abstain from working; or from [ceasing to patronize or to employ] *withholding their patronage from* any party to such dispute, or from recommending, advising, or persuading others by peaceful *and lawful* means so to do; or from paying or giving to, or withholding from, any person engaged in such dispute, any strike benefits or other moneys, or things of value; or from peaceably assembling at any place in a lawful manner, and for lawful purposes; or from doing any act or thing which might lawfully be done in the absence of such dispute by any party thereto; nor shall any of the acts specified in this paragraph be considered or held [unlawful] *to be violations of the anti-trust laws.*

These amendments will be seen to be fundamental and far reaching. The interpolation of the words "whether singly or in concert" is not important, but the elimination of the words "or from attending at or near a house or place where any person resides or works, or carries on business or happens to be, for the purpose of peacefully obtaining or communicating information," strikes from the measure the legalization of picketing, the inclusion of which in the House bill was hailed by the labor leaders as a great victory. The changes made in the language which in the House bill legalized boycotts will also be regarded as a heavy setback for Gompers, Morrison, et al., and the stipulation that only "lawful means" may be employed to attain any of the objects referred to practically nullifies the section from the standpoint of the labor leaders. The most fundamental amendment, however, is in the last clause of the section as passed by the House, which virtually prohibited the invoking of any statute or of the common law to punish the acts specified in the paragraph. By striking out the word "unlawful" and inserting the words "to be violations of the anti-trust laws," the Senate Committee reserves to every employer the right to prosecute lawless strikers under the general laws of the country and deprives them only of the right to invoke the Sherman act and acts amendatory thereof.

Of course, there is absolutely no more ground in reason or equity for granting to labor organizations exemption from the application of the anti-trust laws than from the laws relating to theft or homicide and if the members of the Senate Committee had possessed a little more backbone they would probably have entirely eliminated sections 7 and 18. Being politicians, however, they have taken the ground that the problem should be solved by compromise, with the result that the two sections are now unsatisfactory to both labor organizations and employers, although far less objectionable to the latter class than were the vicious provisions of the House bill. W. L. C.

Arrangements have been made by Pennsylvania State authorities whereby one set of reports on accidents and production will suffice instead of separate reports being required by the bureaus of Statistics and Railways of the Department of Internal Affairs, the Public Service Commission and the Department of Labor and Industry. The reports will be interchanged at the State Capitol and checked up by the Department of Labor and Industry. In the fall this department expects to publish the first Industrial Directory of Pennsylvania. The greater part of it has been compiled. It will contain full information pertaining to the various industries, including names and addresses of iron and steel manufacturers, mining companies and other classes of industries, together with public service corporations, organizations of manufacturers, labor, building trades, commercial men, boards of trade and chambers of commerce.

The France Engineering Company, Toledo, Ohio, has been organized by George L. Kirby, Willis R. France and Isaac Hausman. Messrs. Kirby and Hausman have been connected with the Toledo Bridge & Crane Company, the former as designing and contracting engineer. Mr. France has been connected with the France Stone Company and the France Company in Toledo. The new company has opened offices in the Second National Bank Building.

The Central Steel Company, Massillon, Ohio, recently incorporated with a capital stock of $5,000,000, was organized to erect, own and operate the new open-hearth steel plant that is being built in Massillon in connection with the Massillon Rolling Mill Company. While the two plants will be controlled by the same interests, they will be operated by separate companies, and the latter company will retain its present name.

The Beloit Iron Works, Beloit, Wis., manufacturer of paper-mill machinery, has booked a contract for furnishing one of the largest machines ever built to the Michigan Paper Company, Kalamazoo, Mich. The machine will have 81 drying rolls, 42 in. in diameter and 120 in. long. The foundry has been in full operation the last six months.

The Machinery Markets

In New England, the Atlantic coast States, the Central West and in the Chicago district the machinery trade shows no improvement, but while quiet is still general in these important parts of the country, trade conditions do not appear to have become any worse and there are some grounds for encouragement. New York is as quiet as ever and still basing hope on the coming freight rate decision. In New England conditions are unchanged, with more interest being taken in Congressional politics than in good crop reports. Sales in Chicago continue scarce, but the feeling is that buying in some directions cannot be held off much longer. Milwaukee sellers are doubtful about the coming half year, and at present find that buyers want new machinery at the prices of second-hand equipment. Detroit has had an improved demand for single tools and second-hand equipment is in better request, but the general industrial situation is unchanged. Single tool orders make up such activity as there is in Cleveland, but engineering concerns are figuring on considerable inquiry. Trade continues unsatisfactory in Cincinnati, with second-hand machinery in poor demand and jobbing foundries operating at less than 50 per cent. of capacity. The demand for equipment is reported as improved in the Central South. In St. Louis there has been no large business before the trade, but the demand for single tools is increasing and dealers are encouraged over the outlook. Small factory extensions are contributing to trade in Birmingham, and the good crop outlook is creating optimism. In San Francisco the miscellaneous machinery trade is taking on a little more life. The midsummer dullness in Texas is expected to be shorter than usual.

New York

NEW YORK, July 7, 1914.

The occasional orders being booked by machinery houses are not sufficient in number or in size to alter the state of dullness which has been prevalent for so many weeks, although inquiry is said to be just a trifle better. Hope is again entertained that the Seaboard Air Line, which has recently purchased two or three machines, will shortly close against the revised list of requirements it now has before the trade. It is felt that this road will take quick action, as will several others, once the freight rate decision is announced. It was expected that the Interstate Commerce Commission would make the looked-for announcement long before this and the fact that it has not done so has been a cause of keen disappointment. Many of the sellers are of the opinion that the time has gone by when the greatest good would have been accomplished by the decision, although they still believe that it will stimulate buying, though to a lesser degree. The scarcity of business has caused radical cutting of prices in various kinds of special machinery. As an example of this, there may be cited the case of a very large hydraulic press on which there were a number of bids submitted to a car-building company. The bids ranged from $21,000 to $50,000, with the second lowest estimate about $32,000. The variance in estimates, and especially the lowest, completely mystified some of those who submitted the higher figures.

The Taber Pump Company, Buffalo, N. Y., have plans in preparation for a factory building which they will erect at Elm and Clinton streets at an estimated cost of $30,000.

The Santo Rubber Company, Niagara Falls, N. Y., of which E. F. Brockman is president, is taking new bids for its factory building, 82 x 250 ft., two stories and basement, through the architect, D. A. Crone, Oliver Building, Pittsburgh. The estimated cost is $100,000.

The Electric Elevator Company, Buffalo, has purchased additional frontage on the Buffalo River and the Buffalo Creek Terminal Railroad and will build an extensive addition to its grain elevator plant.

The A. L. Swett Iron Works, Medina, N. Y., of which M. Polar is general manager, is having plans prepared for an addition to its foundry to be built this summer.

The factory of the Merill-Soule Powdered Milk Company, Little Valley, N. Y., was destroyed by fire July 6, including much machinery equipment. The estimated loss is $100,000. Arrangements for the immediate rebuilding of the plant are under way.

The Cox Brass Company, Albany, N. Y., is taking bids for a one-story factory which it will erect on Pleasant street.

Dixon Brothers, Hall, N. Y., have commenced the construction of a cold storage plant 111 x 60 ft., two stories and basement, which they will erect from plans of the Wagner Engineering Company, Rochester.

The O. M. Edwards Company, Syracuse, N. Y., manufacturer of railroad specialties, has let the contract for a two-story addition, 50 x 70 ft., with loading platform 10 x 195 ft., to be made to its factory at Plum and Solar streets.

The Ward Motor Vehicle Company, Mt. Vernon, N. Y., has let the contract for its automobile factory, 200 x 260 ft., one story, to Fountain & Choate, 110 East Twenty-third street, New York City.

The Beaver Company, Buffalo, manufacturer of wall board, etc., has let the general contract for a one-story brick addition to its plant at Beaver road and the New York Central Railroad.

The Oswego Machine Works, Oswego, N. Y., of which Neal Gray is president, has commenced the construction on a one and two-story warehouse addition, 45 x 120 ft.

W. B. Dye, president, board of trustees, Albion, N. Y., is receiving bids for the construction of a new pumping station to cost about $65,000. The J. F. Witmer Company, Buffalo, is the engineer.

The Brohman Company, Newark, N. J., will build a three story and basement brick addition to its factory at 19-21 Center street, at an estimated cost of $20,000.

The city of Kensington, Md., will receive bids until July 23 for a sewer and water system, to cost $50,000. H. W. Hutton, Wilmington, Del., is the engineer.

Articles of incorporation have been filed for the Barmon Brothers Company, Buffalo, by M. and D. W. Barmon and T. Rosenberg, with a capitalization of $300,000, to manufacture ladies' and children's clothing. Arrangements for establishing a factory are in progress.

The commissioner of public works, Albany, N. Y., has petitioned the City Council for the issue of $200,000 in bonds for making extensions of the waterworks system.

The Tioughioga Silk Company, Cortland, N. Y., has filed articles of incorporation to manufacture silk thread and fabrics, with a capitalization of $75,000. J. Griswold, Orange, N. J., and A. Emerich and K. Wilbur, New York City, are the incorporators.

New England

BOSTON, MASS., July 7, 1914.

The Fourth of July week end, coupling a holiday with a Sunday, resulted in an unusual emmigration to summer places, a great many owners and managing officers going away a day or two in advance. It is difficult to judge the business condition. It is no worse; other influences have discounted that of prospective hot weather and the dog days. Observers seem more interested in Congressional politics than in the crop reports.

The Knox Motors Company, Springfield, Mass., has been organized to take over the business and plant of the Knox Automobile Company of that city. The recent sale of the property by the receiver has been ratified by the United States court, so that the new owners are free to carry on their plans for the reorganization of the business. H. G. Fisk, treasurer of the Fisk Rubber Company, Chicopee, Mass., is president, and Mr. Sutton, treasurer. The company will continue the manufacture of Knox-Martin tractors, fire apparatus and cars.

The new management expects to be compelled to increase its manufacturing facilities within a year, though no definite plans to that effect have been made.

The Germania Mills, Holyoke, Mass., manufacturer of woolen goods, has tentative plans for the construction of an addition to its mills, to cost $100,000.

The Livingston Worsted Company, Washington, Conn., will erect an additional weaveshed which will house 100 looms, increasing its capacity 25 per cent.

The large factory of the American Shear & Knife Company, Hotchkissville, Conn., was practically destroyed by fire June 27 with an estimated loss of $100,000. The business is owned by interests represented by Roswell A. Clark, Kansas City, Mo. The products of the company are pocket knives and shears.

The Clinton Wire Cloth Company, Clinton, Mass., proposes to build another addition to its works, to be devoted to the galvanizing department. The building will be 86 x 91 ft., one story.

The Narrow Fabric Company, located in Allington, a suburb of New Haven, Conn., has given the contract for an addition, 120 x 200 ft., one story, of brick and concrete, with saw tooth roof.

The New Haven Web Company, Hamden, Conn., will build a four-story addition, to cost $12,000.

An item in *The Iron Age*, issue of June 25, stating that extensions were being made to the main factory, wire mill and printing room of the Coe Brass Company, Torrington, Conn., is incorrect. The only building under construction at this plant is an extension to the casting shop.

The City Council, Hartford, Conn., has approved the selling of $500,000 of water bonds.

The Waltham Machine Works, Waltham, Mass., will build an addition to its factory.

The Springfield Foundry Company, Springfield, Mass., has begun the construction of a reinforced concrete addition to its plant.

The Middlesex Company, Lowell, Mass., will erect a mill building, to cost $22,000.

The Birmingham Iron Foundry, Derby, Conn., proposes to build a large addition to its plant.

The Farrel Foundry & Machine Company, Ansonia, Conn., plans to erect a brick and steel building on the site of the old carpenter and machine shop on the east bank of the Naugatuck River.

Increases of general manufacturing facilities in New England include an addition to the Park Paper Company, Westville, Conn.; alterations to the factory of C. J. Bates & Son, Norwich, Conn.; remodeling of building at Lowell, Mass., for the occupancy of the Nemock Specialty Company; addition to works of the Ideal Coated Paper Company, Brookfield, Mass.

Chicago

CHICAGO, ILL., July 6, 1914.

While the machine-tool sales now being made are still few and far between, with now and then a week of larger volume, encouragement is had from the increasing evidence that points to a much better situation in the fall. The railroads, although they are covering their activity as much as possible, are noticeably increasing their construction operations with the advent of a new fiscal year, and it is reliably reported that inquiry for shop equipment may be expected to accompany the inquiry already appearing for other forms of much needed equipment.

The Illinois Electric Porcelain Company, Macomb, Ill., has increased its capital stock from $50,000 to $60,000 and will add to its equipment.

The Peerless Drill Company, Rockford, Ill., has increased its capital stock for the purpose of adding to its manufacturing facilities.

The American Hotel Register Company is to build a factory at 224 West Ontario street, Chicago, 87 x 100 ft., six stories and basement, of brick and reinforced concrete, to cost $60,000. Paul F. P. Mueller, 179 West Monroe street, has the contract.

The Automatic Screw Machine Products Company, Chicago, has been incorporated with a capital stock of $16,000 to manufacture hardware. Incorporators are J. Arthur Johnson, Albert W. May, 111 West Monroe street, and Otto G. Griesbach.

The Keokuk Wire Products, formerly known as the Central Indiana Fence & Wire Company, Kokomo, Ind., is to build a factory at Keokuk, Iowa. The new concern is capitalized at $25,000 and will manufacture wire fencing. Its articles of incorporation are so arranged that it may deal in other products, such as barb wire, staples, fence posts, wire stretchers, bale ties, lawn fences, farm gates, nails and other wire fence accessories.

The town of Esterville, Iowa, has voted $60,000 of bonds for improvement to the municipal electric light plant and waterworks.

Southmayd & Webster, McIntosh, Minn., makers of agricultural implements, are laying the foundation for their proposed machine shop.

Bids will be received by J. L. Willis, village clerk, Dalton, Neb., until August 27, for constructing a waterworks to cost $7200.

Sealed proposals will be received at the office of the town clerk of the town of Humboldt, S. D., up to 2 p. m., July 10, for the construction of the new waterworks system.

Charles L. Potter, U. S. engineer, St. Paul, Minn., will take bids until 2 p. m., August 6, for furnishing excavating machinery of the drag-line type fitted with orange peel buckets for the dredge Manitou.

The Twin City Rapid Transit Company, Minneapolis, Minn., is making additions to its shop buildings. Details regarding equipment are not available.

Milwaukee

MILWAUKEE, WIS., July 6, 1914.

Milwaukee manufacturers have entered the last half of the year with less confidence than the first half, due to the fact that events of the past six months did not bear out the hopes for a revival prophesied as 1913 closed. Inasmuch as machinery builders do not expect a great deal during the coming half-year, the slight improvement noted of late, if accelerated henceforth, will receive a better appreciation. Jobbers in machinery, new and second-hand, strike a keynote when they say that buyers will not purchase if they cannot get new goods at second-hand prices. By the same token, used machinery is desired at almost nothing and the inability of sellers to meet these demands is responsible for the dull or almost dead market. Much hope is based on the fact that some buying must sooner or later be forced, due to necessary replacement. It is a well-known fact that some builders have offered buyers goods at just a little better than cost so that the works might be kept in operation and payrolls maintained. No heavy buying movement is in sight.

The Joseph F. Roth Foundry Company, Green Bay, Wis., has been incorporated with a capital stock of $50,000 by J. F. Roth, Josephine Roth and L. D. Joseph. The Roth foundry will be enlarged.

The Federal Rubber Mfg. Company, Cudahy, Wis., is enlarging its factory.

The John O. Hocher Company, Janesville, Wis., has taken over the former plant of the Willard Harlow Company and will continue the manufacture of creamery supplies and appliances. New equipment sufficient only for immediate needs is being purchased.

The Antigo Electric Company, Antigo, Wis., is preparing to increase its capacity to 1000 hp. by installing a 350-hp. boiler.

The Wisconsin Machinery & Mfg. Company, Milwaukee, manufacturer of valveless marine engines and rowboat motors, is moving from its leased quarters in the Menomonee Valley to its own shops in West Allis, which afford 25,000 sq. ft. of space. Most of the tool and machine equipment has been purchased. Louis E. Vogel is president.

The Youghiogheny & Ohio Coal Company, Milwaukee, has been granted a permit to install a $12,000 unloading bridge at its Milwaukee dock. Plans call for seven motors with an aggregate of 457½ hp. The largest motor will be of 300 hp.

The Simplex Demountable Rim Company, Milwaukee, has been organized to manufacture automobile rims and tire appliances. The capital stock is $150,000 and the promoters are M. Rosenheimer, W. J. Sarres and M. H. Rosenheimer. It has been engaged in manufacturing on a small scale for several months, but intends to lease larger factory quarters at once.

The Line City Foundry Company, Beloit, Wis., expects to take occupancy of its new plant August 1. The main building is of steel and brick, 60 x 64 ft., and equipped for gray-iron casting. The owners are A. Balderson, George Bitzer and Daniel Broadhurst.

The board of water commissioners, Kenosha, Wis., is planning to install a large centrifugal pumping engine in the waterworks as a temporary remedy for the present water supply shortage.

The Valecia Condensed Milk Company, Madison, Wis., will build a condensary to cost about $150,000. The Denmark Construction Company, Madison, is the contractor. The date for commencing building operations has not been set.

The Weyauwega Milling Company, Weyauwega, Wis., is about to change its entire drive from steam to electric and enlarge its capacity. Current will be supplied by the Weyau-

Vega Electric Company, which is planning to install a new engine and generator and rearrange its equipment for 24-hr. operation.

The Schwartz Mfg. Company, Plymouth, Wis., furniture maker, will build a 30 x 80-ft. addition to its wood-working shop.

The Pacific Coast Condensed Milk Company, Seattle, Wash., has purchased a site at Oconomowoc, Wis., and will establish a dairy plant to cost $75,000. Construction work will start about October 1.

Indianapolis

INDIANAPOLIS, IND., July 6, 1914.

The Reinforced Box Machine Company, Indianapolis, has been incorporated with $600,000 capital stock, to take over from Jason H. Greenstreet the letters patent for manufacturing reinforced boxes.

The Motor Car Mfg. Company, Indianapolis, has increased its capital stock from $250,000 to $325,000.

The C. A. Shult Mfg. Company, Monticello, Ind., has been incorporated with $225,000 capital stock, to manufacture milling and grain cleaning machinery. The directors are C. P. Ritter, R. D. Cass and M. N. Simon.

The Detroit Tractor Company, Lafayette, Ind., has been incorporated with $100,000 capital stock, to manufacture machinery and tractors. The directors are G. J. Baker, Detroit, F. E. Baker and D. E. Ross, Lafayette.

The Crown Motor Company, Anderson, has been incorporated with $500,000 capital stock, of which $50,000 will be represented in a plant. C. H. Lambert, B. F. Lambert and T. W. Laughlin are directors.

The Albright Aerating Filter Company, Muncie, Ind., has been incorporated with $30,000 capital stock, to manufacture filters. The directors are A. A. Albright, C. L. VanArsdol and J. S. Snider.

The Vigo Ice & Cold Storage Company, Terre Haute, Ind., has increased its capital stock $75,000.

The Full Weight Ice Company, Indianapolis, has been incorporated with $50,000 capital stock, to manufacture ice. It will erect a plant of 100 tons daily capacity. O. H. Faught is secretary.

Detroit

DETROIT, MICH., July 6, 1914.

Business remains about the same. A slightly better volume of single tool orders was reported the past week but no transactions of importance were noted. The national holiday did not seem to affect business to any extent, coming as it did on Saturday. Dealers in second-hand machinery report that this class of equipment is in somewhat better request. No improvement in inquiries is noted. The general industrial situation seems unchanged except that here and there individual plants are better engaged. Building operations are normal but there is little factory construction under way.

The Steere Engineering Company, Detroit, has been incorporated with $50,000 capital stock to manufacture electrical appliances. The incorporators are Frank W. Steere, Warren S. Blauvelt and Andrew H. Green, Jr.

The Fairview Foundry Company, Detroit, has awarded the contract for the erection of a one-story brick and steel foundry building at Jefferson and Lycaste avenues. The company is a subsidiary of the Chalmers Motor Company.

The Simplex Engine Company, Detroit, has been incorporated with a capital stock of $40,000 to manufacture internal combustion engines. The incorporators are Harry Fraser, William G. Taylor and Frank Smallridge.

The Oakland Power Company, Detroit, has been incorporated with $100,000 capital stock to develop the power sites recently purchased by Edwin Denby, heretofore referred to in *The Iron Age*. John F. Deacon, Edwin Denby and Edward P. Decker are among those interested.

The States Cyclecar Company, Detroit, has been incorporated with $150,000 capital stock for the manufacture of cyclecars. Samuel E. Jones and George W. Meredith are among the stockholders. It is understood that manufacturing plans have not yet been completed.

The Safford Radiator Company, Detroit, has been incorporated by J. A. Irwin, M. T. Millard and C. E. Safford. The company is capitalized at $2000 and will engage in the manufacture of automobile radiators.

The Cadillac Machine Company, Cadillac, Mich., is making a number of improvements to its plant. A new foundry building, 50 x 80 ft., is under construction and a new pattern shop and store room will be erected. The old foundry building will be converted into a structural steel shop. Considerable new machinery will be installed in the various departments.

The taxpayers of Wyandotte, Mich., have voted to bond for $40,000 for improvements to the municipal waterworks and lighting plants. Included in the equipment to be purchased are two new boilers and a 500-kw. generating unit.

The Munising Paper Company, Munising, Mich., is making additions and improvements to its plant which will involve the expenditure of over $200,000. A new slab mill is being built and the bleaching, wood and finishing rooms are being enlarged. Considerable special equipment will be installed.

The Montgomery Screen Door Company, Montgomery, Mich., has increased its capital stock from $15,000 to $30,000 to provide for growing business. A warehouse, 50 x 120 ft., three stories, will be erected.

The Morrill & Morley Company, Benton Harbor, Mich., manufacturer of spray pumps and other specialties, is erecting a new factory building 60 x 140 ft., two stories. The new building will greatly increase the company's capacity.

The Electric Light & Power Company, Munising, Mich., has completed plans for a new plant to cost $15,000. The building will be one-story, 45 x 130 ft., and will be equipped in part by three 150-hp. boilers, one 250-kw. and one 100-kw. three-phase generator.

The Safety Elevator Stop Company, Kalamazoo, Mich., has been organized with a capital stock of $30,000 by E. S. Rankin, A. L. Pratt and John King, to manufacture automatic lever safeguards and various elevator appliances.

Cincinnati

CINCINNATI, OHIO, July 6, 1914.

Reports from different machinery dealers and manufacturers are somewhat conflicting. Taken as a whole, June was a very unsatisfactory month, with the possible exceptions of wood-working and small electrical equipment. A few machine-tool builders report the month of July as starting off a little more encouragingly. A number of scattered orders and inquiries were received, but there is yet no buying on the part of the larger concerns that use machine tools. The export business has also shown a little improvement in the past week. As was previously announced, a number of local manufacturers expect to be closed down longer than the usual week or 10 days set aside for making repairs and taking inventories, and several will hardly start up before August 1.

Second-hand machinery dealers have a very slack business, with no indications of any improvement soon. The jobbing foundries are also slowing down, and if the stove foundries were not figured in the general average there would be less than 50 per cent. of activity to report.

The Kruse Hardware Company, Cincinnati, has leased through Nicholas P. Smith & Co. an eight-story building at Carlisle avenue and Baymiller street that will be fitted up with the latest improved freight-handling devices. Considerable special equipment will be required. The company is a wholesale hardware dealer and now occupies 10 buildings on Pearl street.

John Bangert & Son, Cincinnati, are having plans prepared for a large addition to their tannery on Straight street. Nothing is known as to equipment requirements.

Work on the reassembling station for the Ford Motor Company's Cincinnati branch is progressing at a satisfactory rate and the building will be ready for installing the necessary equipment within the next six weeks.

The American Cotton Oil Company, Cincinnati, has let contract for a cooper shop to be constructed adjoining its plant on Sixth street.

The Clifton Springs Distilling Company, Cincinnati, has let contract for a large cooper shop, estimated to cost $12,000. Only special machinery equipment will be required.

It is reported that the Davies Soap Company, Dayton, Ohio, contemplates erecting a large factory at Middletown, Ohio. If present plans are carried out, power plant and other equipment will be required.

The Middletown Artificial Ice Company, Middletown, Ohio, has increased its capital stock from $20,000 to $100,000, and will probably make some additions to its plant the present year.

The Columbus Die, Tool & Machinery Company, Columbus, Ohio, has definitely decided to erect a factory. Plans are in charge of F. L. Packard, Columbus, the architect.

Machinery is being installed in the branch plant of the Ford Motor Company, Columbus, Ohio.

The Columbus Railway, Power & Light Company, Columbus, Ohio, is preparing to issue bonds for a large sum in order to extend its service. It is understood that additions to the power house are planned.

The Henry Burkhardt Packing Company, Dayton, Ohio, has completed plans for a new plant to cost approximately $100,000. Considerable refrigerating equipment will be required for the new building.

S. A. Kinnear, director of public service, Columbus, Ohio, will open bids July 14 for two 150-kw. self-cooled transformers.

The Remy Electric Company, Anderson, Ind., is making an addition to its plant that will be used for the manufacture of automobile specialties.

The Citizens' Light & Power Company, Millersburg, Ohio, has been incorporated with $35,000 capital stock by R. E. Dreyer and others.

Cleveland

CLEVELAND, OHIO, July 6, 1914.

Business in machine-tool lines shows practically no change. Dealers are getting few orders except for single tools and these orders, which are mostly for small machines, are far from plentiful. Automobile builders are placing orders for parts for their 1915 cars and the general feeling in the trade appears to be that the demand for automobiles next year will exceed that of the present year. It is expected that the year will be marked by a large increase in the production of low-priced cars. Engineering firms are figuring on considerable inquiry for power-plant work, which if placed will stimulate the demand for such equipment. Selling agencies report a fair demand for small steam turbines.

The Richard Automobile Mfg. Company, Cleveland, expects shortly to begin the erection of a plant on Finney avenue and the Belt Line Railroad for the manufacture of touring cars. There will be provided 25,000 sq. ft. of floor space. As the parts will be made by other plants, the work in the plant will be confined mostly to assembling so that little machinery will be required, although a few small machine tools may be purchased.

The K. W. Ignition Company, Cleveland, will enlarge its plant by the erection of a steel trussed addition, 83 x 127 ft.

It is announced that the Ross Clay Product Company, Uhrichsville, Ohio, recently incorporated with a capital stock of $100,000, will shortly begin the erection of a plant near Dennison. George Ross, Sr., is president, and C. W. Rice, secretary.

At a recent meeting of the Ohio Road Machinery Company, Oberlin, Ohio, W. A. Heusner was elected president; J. W. Boss, vice-president, and C. H. Dudley, secretary and treasurer. The company has a new plant under construction.

The Timken Roller Bearing Company, Canton, has awarded a contract for the erection of a factory addition, 50 x 100 ft.

The city of Spencerville, Ohio, has voted $10,000 of bonds to rebuild its electric lighting plant.

A new foundry and machine shop has been established in Marion, Ohio, by the Blocksom Brothers Construction Company, composed of Earl H. Blocksom and four brothers. The plant is located on Framing street.

The foundry of the Huber Mfg. Company, Marion, Ohio, was recently damaged by fire, the loss being about $3000.

The Newby Process Insulator Company, Youngstown, Ohio, which has succeeded the Newby Mfg. Company, and increased its capital stock from $10,000 to $500,000, has completed plans for a new plant, the erection of which is expected to be started shortly. The company will make insulators and other porcelain products.

Wheeling

WHEELING, W. VA., July 6, 1914.

The Southern Lumber Company has purchased the plant formerly occupied by the Parkersburg Mantel & Tile Company, Parkersburg, W. Va., and will install new woodworking machinery. John Burkholz is manager.

The Monongahela Valley Traction Company, Fairmont, W. Va., will abandon its power plant at Jayette, built at a cost of $300,000, because of the poisonous waters there, and build a new plant, likely at Hutchinson, W. Va., in which gas instead of steam engines will be used.

The Wayne Brick & Tile Works, of Wayne, W. Va., has been incorporated with $25,000 capital stock by B. J. Prichard, P. H. Napier, O. J. Rife, and others.

The Granite Block & Tile Mfg. Company, Charleston, W. Va., has been incorporated with $50,000 captal stock by

The Neff-Burns Electric Company, Wheeling, W. Va., has been incorporated with $25,000 capital stock by W. S. Neff, William J. Burns, E. J. Stephens, and others.

The Dawson Stand-Pipe Balance Company, Bluefield, W. Va., has been incorporated with $50,000 capital stock by J. R. Anderson, W. R. Dawson, G. M. Barger, and others.

The Bluefield Brick Company, Bluefield, W. Va., has been incorporated with $50,000 capital stock by G. M. Barger, Floyd Henderson, W. F. Houck, and others.

The Central South

LOUISVILLE, KY., July 6, 1914.

Trade conditions in this territory, judging by the tone of manufacturers' and dealers' reports, are improving noticeably. The bulk of the business for some time has been coming from public works and buildings, but manufacturing plants are now taking care of a considerable amount of new equipment. Boiler sales are improving, several large installations having been arranged for recently. The demand for electrical equipment is good, while machine tools are also moving well. Motor-driven tools, direct-connected, are in particularly good call, it is reported. Wood-working machinery is probably the most active line of special machinery, a number of planing-mills, furniture factories, etc., being established in this territory. Not so much complaint is being heard regarding cut prices, though competition at present is largely on that basis.

The James Clark, Jr., Electric Company, Louisville, has etsablished a New York sales office. C. H. Grafflee is in charge.

H. C. Brown, Harlan, Ky., is planning the establishment of a brick manufacturing plant.

The Paris Gas & Electric Company, Paris, Ky., has increased its capitalization from $75,000 to $150,000.

A coal operation which will require a large amount of power and special equipment is that which the East Tennessee Coal Company, Knoxville, Tenn., will establish at Hazard, Ky. The initial plant to be installed will have a capacity of 1000 tons a day. The equipment for the mine will be electrically operated. The company plans to establish its own power plant. W. E. Davis, Hazard, Ky., is vice-president and general manager.

The Danville Light, Power & Traction Company, Danville, Ky., has increased its capitalization from $50,000 to $100,000.

A municipal ice factory may be established at Hardin, Ky. Prices on equipment for a 6-ton plant are now being secured by L. C. Starks, the mayor.

Prather Brothers, Georgetown, Ky., who, as recently reported, will make a patented demountable automobile wheel, have purchased a building and are equipping it.

The town of Lawrenceburg, Ky., is making improvements in its water plant. Additional boilers and engines are to be installed in the pumping station.

The National Pin & Bracket Company, Madison, Ind., whose factory was recently burned, has started to rebuild.

The Fulton Company, White avenue and Second street, Knoxville, Tenn., has taken out permits for the erection of three new factory buildings. The buildings are one-story, of concrete and brick construction.

The Hardwood Top & Panel Company, Morristown, Tenn., has been organized with $25,000 capital and will establish a plant for the manufacture of glued-up tops and panels for the furniture trade. Power equipment, saws, planers, glue-spreaders, presses and drying equipment will be needed. J. N. Fisher is president and H. S. Taylor, manager.

The Bristol Machine & Locomotive Works, Bristol, Tenn.-Va., has been organized with $25,000 capital stock to repair and rebuild locomotives and manufacture machinery. It has acquired the plant of the Bristol Machine Works and will operate on a much larger scale, installing additional machinery and remodeling the plant. Charles H. Rhodes is vice-president and general manager, and Z. T. McKinney, president.

The Killman Hydraulic Power Transmission Company, Nashville, Tenn., has been organized by T. A. Killman, and others, to manufacture a patented valveless hydraulic pump.

The Pine Mountain Lumber Company, Chattanooga, Tenn., has been organized with $20,000 capital stock and will install a hardwood bandmill for the manufacture of dimension stock. D. W. Atchison is president.

A motor, machine tools and other equipment for a garage and machine shop are wanted by A. H. Johnson, 913 Garden street, Columbia, Tenn. He is now asking for prices on this equipment.

Hart & Gardner, Nashville, Tenn., want prices on boilers for a school heating plant.

J. S. Madry & Son, Murray, Ky., have established an electric light plant at Camden, Tenn., and will shortly be in the market for electrical and power plant supplies.

A new buyer of machinery and mill supplies is the Bristol Brick Company, Bristol, Tenn., which is completing the equipment of a plant, with a daily capacity of 50,000 brick.

The Treswell Brick & Tile Company, Nashville, Tenn., has been incorporated with a capital stock of $25,000 by William Shipman, A. S. Warren and J. W. Pritchett.

The Citizens Compress Company, Jackson, Tenn., recently organized with a capital stock of $75,000 by R. L. Taylor, J. L. Nance and others, will equip with an 80-in. compress.

The city commissioners of Springfield, Tenn., will spend $10,000 increasing the equipment of the electric light plant.

The Hamblen County Creamery, Morristown, Tenn., of which W. H. Mullins is president and R. F. Hopkins manager, will install about $4000 worth of equipment.

The Seaton Pneumatic & Cushion Tire Company, Nashville, Tenn., has been incorporated with a capital stock of $25,000 by R. B. Lees and others and will manufacture automobile tires.

The Nashville Boat Mfg. Company, Nashville, Tenn., has been incorporated with a capital stock of $15,000 by M. A. Duncan, J. H. McLean, W. L. Looney and others and will install mill equipment, band saws, etc. Marine engines are wanted. Address 3907 Elkins avenue, West Nashville.

Birmingham

BIRMINGHAM, ALA., July 6, 1914.

The best crops on record in this section have caused a return of confidence almost approaching optimism. Small factory construction features Southern industrial development and calls for a variety of equipment. Electrical apparatus for mine and mill will be called for extensively, while the agricultural demand is steadily increasing and will be large with the garnering of the cotton crop. Very little large machinery business is done, but the aggregate is more satisfactory.

Bids will be received until July 21 by J. D. Edmundson, mayor, LaGrange, Ga., for a waterworks system, including filtration plant, electric pumping machinery, etc.

The Attalla Oil & Fertilizer Company, Attalla, Ala., has been incorporated by C. B. Forman, W. F. Stowers, Lamar Smith, and others, with a capital stock of $50,000, and will build a cotton-seed oil mill.

It is reported that the Alabama Power Company, Birmingham, intends the building of a hydroelectric plant at Cherokee Bluffs.

The Leeds Light & Power Company, Leeds, Ala., has been incorporated by Thomas W. Martin, of Birmingham, and others. It will build a plant at Leeds to use the current of the Alabama Power Company on the Coosa River.

The Georgia Crate & Basket Company, Thomasville, Ga., will build a plant in place of the one recently burned.

The Cottondale Lumber Company, Cottondale, Fla., has been incorporated by Arthur Williams and associates, and will build a lumber mill.

The city of Cullman, Ala., voted $30,000 of bonds, which will be used in building a dam and pumping station, etc.

The E. L. Kendall Company, Huntsville, Ala., will rebuild its lumber mill recently burned.

The Cunningham & Floyd Lumber Company, Tuscaloosa, contemplates rebuilding its lumber plant recently burned at a loss of $20,000.

The Columbus Lumber Company, Columbus, Miss., has purchased 13,500 acres of timber land near Winfield, Ala., and contemplates its development.

The city of Florala, Fla., has voted to issue bonds to the amount of $20,000 for the purpose of repairing, extending and enlarging the waterworks plant, etc.

The water board of Macon, Ga., will purchase a pressure pump.

Texas

AUSTIN, TEX., July 3, 1914.

The midsummer dullness in the machinery and tool trade is now here. It is expected, however, that the volume of business this season will be considerably larger than last. There is a wider and more general demand for machinery than ever before at this time of year. Money from the earlier crops is now getting into circulation and as soon as cotton begins to move it is expected other lines of industry will become more active. Crop prospects are good.

The Farmers' Union Gin Company, North Pleasanton, is constructing a cotton gin.

C. B. Oliver, Caldwell, and associates, have taken steps to install a cotton compress.

The Merchants & Planters' Gin Company, Ferris, has been organized with a capital stock of $16,000 and will build a cotton gin. T. G. Cole, J. A. Carpenter and J. V. Mutz are the incorporators.

The Farmers' Gin Company, Venus, will construct a cotton gin. W. H. Shirley is interested.

The city of El Paso has sold $150,000 of waterworks bonds which will be used for making improvements to the waterworks plant and distributing system.

The City Council of San Benito has granted a 50-year franchise to S. A. Robertson, trustee of the San Benito Water Company, who will install new machinery and make other improvements to the waterworks.

C. F. Smythe and associates, Orange, plan the installation of an electric power plant.

St. Louis

ST. LOUIS, MO., July 6, 1914.

The holiday shortening of the week, as well as the usual influences which prevail with the end of one half year and the beginning of another, have resulted in some little addition to the dullness of the machine-tool business in this market. Dealers continue to be encouraged over the outlook, particularly as a result of the bank statements of this section and the status of the crops and the harvest. Early harvesting of an exceptional wheat crop is already beginning to have its effect on the commercial situation in territory near St. Louis and practically all lines of business are looking for an exceptional fall and winter business. Large lists continue to be absent, but an increasing inquiry for single tools and replacement equipment is noted, while second-hand tools are receiving a little attention. It is only in the actual closing of contracts that the week has shown its slowing up. Collections are reported quite satisfactory.

The International Wire Stitched Package Company, St. Louis, has been incorporated with a capital stock of $50,000 by Ennis and G. M. Walker, H. C. White and Arthur J. Fitzsimmons to manufacture a special package container and also wooden and paper boxes.

The Pull-U-Out Mfg. Company, St. Louis, has been incorporated with a capital stock of $100,000 by Ross Houck, F. P. Cornish, T. A. Medlen, W. A. Farr and J. B. Furry to manufacture geared pulleys and other special equipment.

The Economy Oil Burner Company, St. Louis, has been incorporated with a capital stock of $25,000 by A. J. Kessinger, A. N. Morton and J. C. Wasson to manufacture a patented device.

The West End Auto Repair Company, 5883 Delmar avenue, St. Louis, of which William Clise is president, will remove to a larger building and increase the facilities of its repair plant.

The Hope Fan & Blower Company, Kansas City, Mo., has been incorporated with a capital stock of $12,000 by J. F., A. and J. T. Hope to manufacture fans and blowers.

The plant of the Marblehead Lime Company, Springfield, Mo., was burned June 29 with a loss of $100,000. The equipment will be replaced at once, it is stated.

The Davis Boring Tool Company, St. Louis, has about completed plans, it is stated, to open a factory at St. Charles, Mo.

The Caruthersville Sand & Supply Company, Caruthersville, Mo., recently incorporated, is in the market for conveyors, dredging machinery, etc., for a river bed sand plant which will be operated by it.

The Coca Cola Company, Atlanta, Ga., will build a 12-story factory at Kansas City, Mo., installing private power plant, engines, etc.

The city of Cassville, Mo., will expend $6000 on additional equipment for its waterworks plant.

The city of Charleston, Mo., has completed its plans for the equipment of its waterworks, under the direction of Frank Wilcox, St. Louis, the engineer.

The Lakeport Land Company, Long Building, Kansas City, Mo., is in the market for dredging machinery, ice plant, etc.

The Standard Motor Car & Mfg. Company, Kansas City, Mo., has been incorporated with a capital stock of $10,000. Incorporators are H. T. Folsom, J. E. Harvey and J. B. Renshaw.

The capital stock of the Blytheville Cooperage Company, Little Rock, Ark., has been increased from $15,000 to $50,000.

The Carter Carburetor Company has bought the factory building at 2840-44 North Spring avenue, St. Louis, Mo. The lot is 90 x 250 ft., partly occupied by a three-story building. The unoccupied part of the lot will be improved with a foundry building for the manufacture of brass castings.

The St. Louis Screw Company, St. Louis, Mo., is making rapid progress in the preliminary construction of its new plant at 6808 Prescott avenue. The cost will be $41,000.

The Crawford County Cotton Oil Company, Mulberry, Ark., has been incorporated with a capital stock of $60,000 by Geo. H. Walker, R. E. Lillard, and others.

The Doston Lumber Company, Soarkman, Ark., has plans for the immediate construction of a planing mill.

The new shop of the Prescott & Northwestern, to be rebuilt following the recent fire at Prescott, Ark., will require about $10,000 worth of equipment. H. E. Bemis is in charge.

Bids will be opened about November 1 for a waterworks plant and sewage disposal system to be built at Benton, Ark., at a cost of about $60,000 by the city. Mayor R. C. Bailey is in charge and E. A. Kingsley & Co., Little Rock, are the engineers.

Under a bond issue the city of Heber Springs, Ark., will build a waterworks plant.

The plant of the Ft. Smith Casket Company, Ft. Smith, Ark., burned with a loss of $10,000 on equipment, will be replaced at once.

About $25,000 will be expended by the city of Cushing, Okla., on a waterworks plant. The mayor is in charge.

The city of Mangum, Okla., has plans for the equipment of an electric light and ice-making plant. The mayor is in charge.

The Meridian Light & Railway Company, Meridian, Miss., will enlarge its power plant and install engines and a 500-hp. boiler.

The sawmill of Usher Brothers, Shuqualak, Miss., recently destroyed, with a loss of $25,000, will be replaced.

The city of Batesville, Miss., is receiving bids on equipment for a waterworks plant, including oil engine, pump, etc. The Dabney Engineering Company, Memphis, Tenn., is in charge.

J. Bart Davis, A. C. Vreeland, John Merkl and F. F. Philibert, of New Orleans, La., have formed an incorporation with $1,000,000 capital stock to build automobiles, gas engines, etc.

A coal dock, to cost with conveying equipment about $250,000, is to be constructed at New Orleans, La., by the Louisville & Nashville, Illinois Central, Alabama Great Southern and New Orleans & Northeastern railroads.

The Louisiana Nut & Machinery Company, New Orleans, La., has been incorporated with a capital stock of $100,000 by Samuel Blum, J. E. Friend and Joseph Samuel, and will manufacture machinery.

The Martinsville Excelsior & Mfg. Company, Martinsville, Miss., has been incorporated with a capital stock of $10,000 by M. S. McNeill, C. S. Loeb and others and will equip a plant.

San Francisco

SAN FRANCISCO, CAL., June 30, 1914.

The miscellaneous machinery trade is taking on a little more life, though the only lines which may be described as really active are agricultural goods and mining equipment. Many old mines are being reopened, as it is found that low-grade ores can be profitably handled by modern processes. The situation in contractors' supplies is more favorable. Machine tools remain quiet, but more small orders are coming from country garages and repair shops, and several manual training school inquiries are appearing. No strong movement has developed in wood-working and logging machinery.

Most local shops and foundries are still quiet, though the larger shipbuilding plants, such as the Union Iron Works and Moore & Scott Iron Works, are fairly busy. The latter firm has just taken a contract for a new Key Route ferry steamer at $305,000, and a similar boat will be built by the United Engineering Works for $314,000.

W. Gilbert, Sacramento, Cal., is making arrangements to build a furniture factory.

The South Coast Land Company, Oceanside, Cal., is taking figures on a large pumping plant on the San Luis Rey River.

The San Francisco Board of Trade has filed a petition in bankruptcy against the Globe Iron Works, Sacramento, Cal., which resumed operations about the first of the year under the management of B. F. Taylor, of Los Angeles, and T. R. Waller, of Seattle. Plans are being considered to refinance the company, which has a plant valued at about $117,000.

The R. Kelly Machinery Company, 524 Mission road, Los Angeles, Cal., has been incorporated by R. Kelly, A. Levin and S. Hagen, with a capital stock of $50,000. It will take over the second-hand machinery and boiler business of R. Kelly.

It is reported that the Atchison, Topeka & Santa Fe Railroad will build a repair shop at Kingman, Ariz.

The Universal Tire Company, Anaheim, Cal., is equipping a plant for the manufacture of automobile tires.

The Pressed Steel Tie Company, Los Angeles, has been incorporated with a capital stock of $100,000 by T. H. Liddecent, T. M. Stewart, W. N. Holmes, S. C. Graham and R. Mackay.

The Imperial Valley Gypsum Company, Holtville, Cal., is putting in a new plant.

The Arizona Power Company, Prescott, Ariz., is preparing to add a new unit to its hydroelectric plant.

The city commission, Salt Lake City, Utah, has approved the sale of $200,000 of water bonds.

The Pacific Northwest

SEATTLE, WASH., June 30, 1914.

Miles A. Goodyear, Lamont Rolands, and others, recently filed articles of incorporation for the Goodyear Logging Company, Seattle, with a capitalization of $200,000.

The City Council, Ft. Benton, Mont., will purchase and improve the electric light plant of the Benton Electric Light Company.

The City Council, Seattle, Wash., will at once proceed with the completion of the first unit of its steam plant. An appropriation of $125,000 was made for this work.

The port of Portland, Ore., has recently leased to the Western Cooperage Company a large tract of tidelands, on which the latter plans the construction of an up-to-date mill.

The mill of Pelican Bay Lumber Company, Shippington, Ore., was completely destroyed by fire recently, entailing a loss of more than $90,000.

The Aero Fire Alarm Company, 6 Church street, New York City, recently announced that it would transfer its headquarters from that city to Seattle and will thereafter do its manufacturing here.

S. L. Hanley, city engineer, Havre, Mont., will receive bids until 8 p. m., July 20, for constructing a filtration works, a disposal plant, etc.

The Choteau Light & Power Company, Choteau, Mont., plans extensive improvements and alterations to its electric plant this year.

The Northwest Electric Company, Astoria, Ore., is completing plans for the erection of a large power plant on White Salmon River, 12 miles from White Salmon.

Eastern Canada

TORONTO, ONT., July 4, 1914.

The Canada Wire & Cable Company, Ltd., which is erecting a plant at Leaside, Ont., has increased its capital stock from $500,000 to $3,000,000. The new plant will manufacture aluminum and copper wire, and electric transmission cables.

The Canadian Northern Railway Company will erect large shops at Leaside, Ont.

Du Pont Safety Powder Company of Canada, Ltd., Montreal, has been incorporated with a capital stock of $2,000,000 by D. P. Gillmor, F. G. Bush, G. R. Drennan, and others, to manufacture explosives, etc.

L. J. A. Surveyer, Ltd., Montreal, has been incorporated with a capital stock of $50,000 to manufacture electrical machinery, etc., by E. F. Surveyer, C. G. Ogden, P. S. Conroy, and others.

The Hall Engineering Works, Ltd., Montreal, has been incorporated with a capital stock of $200,000 by Thomas Hall, F. H. Fox, R. B. Proctor, and others, to manufacture machinery and carry on the business of metal founders, tool makers, etc. Thomas Hall is manager.

The Imperial Waste & Metal Company, Ltd., Montreal, has been incorporated with a capital stock of $50,000 by A. R.

Hall, Louis Fitch, P. A. Badeaux, and others, to operate mills, smelters, etc., for the manufacture of machinery, etc.

The Upper Fraser Lumber Company, Ltd., Montreal, has been incorporated with a capital stock of $3,250,000 by W. R. L. Shanks, M. J. O'Brien, H. W. Jackson, and others, to operate pulp, card board and paper mills.

The Hedley Shaw Milling Company, Ltd., Toronto, has been incorporated with a capital stock of $1,000,000 by W. D. Toye, A. E. Moysey, Alexander Mullin, and others, to build and operate mills for the manufacture of flour, feed, etc.

The Ford City Metal Products Company, Ltd., Ford City, Ont., has been incorporated with a capital stock of $100,000 by J. H. French, W. F. Tant, H. P. Cope, and others, to manufacture metal products, etc.

The Northern Trap Rock Company, Ltd., Toronto, has been incorporated with a capital stock of $1,000,000 by H. A. Hall, J. J. Flint, W. B. Henderson, and others, to manufacture clay products, stone, cement, etc.

The American Road Machine Company of Canada, Ltd., Goderich, Ont., manufacturer of rock crushers, contractors' machinery, etc., has increased its capital stock from $100,000 to $500,000.

The ratepayers of Simcoe, Ont., passed a by-law to grant $40,000 for the purpose of installing a hydroelectric plant.

The ratepayers of Berlin, Ont., passed a by-law to grant a loan of $15,000 for a number of years to the Doering Trunk Company, which will erect a factory.

The capital stock of the Bathurst Lumber Company, Ltd., Bathurst, N. B., has been increased from $1,000,000 to $5,000,000.

Western Canada

WINNIPEG, MAN., July 3, 1914.

Demand for machinery is fair. Municipalities are good purchasers of supplies, making repairs and building additions to waterworks and electric light plants. A number of towns are preparing to make improvements. Reports indicate that there should be an active demand for the rest of this year for steam and hot-air heating machinery for large buildings. Much industrial expansion is not likely. Contracts for machinery for new manufacturing plants are comparatively few.

A brick plant with a capacity of 40,000 brick per day is to be erected at Regina, Sask., in the near future, according to a report from the board of trade. R. E. A. Leach, Regina, is financing the proposition.

It is announced that the Grain Growers' Grain Company, Winnipeg, will erect ten grain elevators at different points to be ready to handle this year's crop.

Alexander Harrison, Minneapolis, Minn., and others, will erect an ice factory at Regina, Sask., with a capacity of 30 tons a day.

The Wabanun Power Company, Edmonton, Alta., is having plans prepared for the construction of an electric power plant with a capacity of 10,000 kw.

Work has been started on the construction of the shipbuilding and drydock plant of the Dominion Shipbuilding, Engineering & Drydock Company, Ltd., Vancouver, B. C. The total cost of the plant will be in the neighborhood of $5,000,000, and when completed will employ 7000 men. A large amount of machinery will be used.

Large additions will soon be made to the waterworks plant at Fort George, B. C.

The ratepayers of Nanaimo, B. C., have passed a by-law to grant $30,000 for a waterworks system.

The ratepayers of Cranbrook, B. C., passed a by-law to grant $110,000 for improvements to its waterworks plant.

The North Burnaby Lumber Company, Burnaby Lake, B. C., will erect a sawmill with a capacity of 40,000 ft. per day.

Government Purchases

WASHINGTON, D. C., July 6, 1914.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, on June 26, for supplies for the Navy Yards, as follows:

Schedule 6897, Construction and Repair

Class 1, f.o.b works—One convertible punch or shear—Bid 5, $1700 and $1725; 21, $1640.50; 31, $1755; 36, $1395; 38, $1984; 47, $1346.20; 50, $1061.50; 51, $1695; 52, $2130.

Class 2, f.o.b. works—One punch or shear—Bid 5, $2067 and $2087; 21, $1840.50; 31, $2065; 36, $1725; 38, $2324; 47, $1422.25; 51, $2145; 52, $2450.

Class 3, f.o.b. works—One horizontal punch—Bid 31, $920; 36, $765; 38, $1224; 47, $865; 51, $1085; 52, $1585.

Class 4, f.o.b. works—One radial wall drill—Bid 40, $950; 47, $999; 52, $750.

Class 5, f.o.b. works—Three motor-driven radial wall drills—Bid 40, $830; 47, $2999; 52, $675 and $765.

Class 6, f.o.b. works—One drilling and tapping machine—Bid 28, $2000; 32, $1560 and $1990.

Class 7, f.o.b. works—One pneumatic riveter—Bid 7, $585, $430 and $397; 12, $500; 28, $508 and $575; 31, $360 and $400; 46, $743.

Class 8, f.o.b. works—One radial 3-post drill—Bid 19, $6000, $6300, $3500 and $3275; 52, $430, $520 and $700.

Class 9, f.o.b. works—One planing machine—Bid 4, $8080; 5, $2689 and $2716; 32, $5185; 43, $6660; 51, $4495; 52, $4000.

Class 10, f.o.b. works—One convertible punch and shear—Bid 4, $2930; 21, $2063; 47, $1699.90; 50, $3174; 51, $2865; 52, $3025.

Class 11, f.o.b. works—One gate type shear—Bid 4, $5700; 5, $5460 and $5915; 7, $3757; 21, $4505; 47, $4995; 50, $12,950 and $7995; 51, $4735; 52, $6500; 53, $6452.

Class 12, f.o.b. works—One punch or shear—Bid 5, $1495 and $1520; 21, $1213; 31, $868; 36, $1100; 38, $1085; 47, $1094; 50, $1011.50; 51, $1475; 52, $1650.

Schedule 6898, Construction and Repair

Class 21, Brooklyn—One electrically driven gate shear—Bid 4, $2870; 5, $2761 and $3065; 21, $2375; 28, $2165; 32, $2725; 51, $2873; 52, $2850; 53, $4498.

Class 22, Brooklyn—One power brake—Bid 7, $4135 and $3288; 24, $4200 and $3305; 28, $4135; 35, $4340, $4315 and $3195.

Class 23, Brooklyn—One set of 10-ft. power-bending rolls—Bid 5, $1114 and $1074; 21, $1087; 44, $882.

Class 24, Brooklyn—Two rectangular lifting magnets—Bid 11, $222; 16, $253.

Class 25, Philadelphia—One gate shear—Bid 4, $6290; 5, $4572 and $4897; 7, $3816 and $3757, alt; 21, $4946.85 and $5051.25; 28, $4075; 32, $4750; 36, $4955; 47, $5295; 51, $4495; 52, $4600; 53, $5454.

Class 26, Philadelphia—One hand jointer—Bid 3, $525.85, $454.85 and $390.85; 6, $491.08; 18, $397.50; 24, $394 and $349; 33, $428; 37, $350 and $385; 39, $320.

Class 27, Philadelphia—One plate-joggling machine—Bid 4, $4900; 26, $4666 and $4360; 51, $4322.

Class 28, Philadelphia—One 25-spindle combination dovetailing machine—Bid 7, $725; 37, $830.

Class 29, Norfolk—One radial drilling and countersinking machine—Bid 17, $1378; 24, $970 and $1135.

Class 30, Philadelphia—One 5-ton hydraulic rising jib crane—Bid 9, $1035; 48, $1075; 49, $959.

The names of the bidders and the numbers under which they appear in the above list are as follows:

3, American Woodworking Machinery Company; 4, Bethlehem Steel Company; 5, Bertsch & Co.; 6, Berlin Machine Works; 7, F. A. Branda & Co.; 9, Camden Iron Works; 11, Cutler-Hammer Mfg. Company; 12, Chicago Pneumatic Tool Company; 16, Electric Controller & Mfg. Company; 17, W. H. Foster; 18, J. A. Fay & Egan Company; 19, Charles H. Graff; 21, Huntington Machine & Foundry Company; 24, Kemp Machinery Company; 26, Morgan Engineering Company; 28, Manning, Maxwell & Moore; 31, D. Nast Machinery Company; 32, Niles-Bement-Pond Company, 33; Oliver Machinery Company; 35, George A. Ohl Company; 36, Henry Pells & Co.; 37, L. Tower & Co.; 38, Prentiss Tool & Supply Company; 39, C. O. Porter Machinery Company; 40, Pawling & Harnischfeger Company; 43, William Sellers & Co.; 44, D. H. Stoll Company; 46, Vulcan Engineering Sales Company; 47, Wickes Brothers; 48, Watson-Stillman Company; 49, William H. Woods; 50, Wiener Machinery Company; 51, Hilles & Jones Company; 52, Cleveland Punch & Shear Works; 53, Williams, White & Co.

History of the Galvanizing Industry

The Meaker Company, Fulton and Elizabeth streets, Chicago, recently issued in attractive pamphlet form a very interesting and valuable narrative of the history and development of the galvanizing industry. As an introduction to the discussion of corrosion and its prevention, this pamphlet relates briefly the story of early iron-making processes, the later development of steel, in which its greater susceptibility to corrosion as compared with wrought iron was outweighed in importance by many other considerations, and the problem of checking corrosion has increased proportionately as steel has found wider fields of usefulness. How the electro-galvanizing process, founded upon the natural protective qualities of zinc, has been perfected is then described from the practical standpoint of this company which has specialized in electro-galvanizing. The various limitations and difficulties presented by equipment and the advantages of different practices are touched upon. In conclusion the several tests for galvanized products are described in detail.

Trade Publications

Well Drilling Machines and Internal Combustion Engines.—Carnegie Engineering Corporation, Whitehall Building, New York City. Bulletins Nos. 101 and 103. The first is concerned with a line of steel well drilling machines for use on all classes of work for which this type of equipment is generally employed. The construction of the machine is described at some length, the text being supplemented by a number of illustrations. In addition to the ordinary type a machine is built in which a tractor unit is provided. The second bulletin describes a four-cylinder, four-cycle internal combustion engine, which is built to develop from 10 to 16 hp. Illustrations and brief specifications are included.

Electric Motors.—Wagner Electric Mfg. Company, 6400 Plymouth avenue, St. Louis, Mo. Calendar. This calendar starts with June 1 and contains a pad with easily read figures, and an engraving of one of the company's motors.

Electric Hoists.—Pawling & Harnischfeger Company, Milwaukee, Wis. Bulletin No. 301A. Treats of the application of electric hoists for handling loads in connection with an overhead monorail system. A number of views are given of the hoist in service for handling pipe and miscellaneous material and boxes and equipped with a lifting magnet for handling sheets.

Marking Devices and Metal Signs.—James H. Matthews & Co., 3942 Forbes street, Pittsburgh, Pa. Catalogue No. 72. Size, 6¾ x 9¾ in.; pages, 208. Pertains to an extensive line of marking devices for stamping hot and cold metals, logs, timber, tin plate, billets, rails, bars, structural work, etc. Mention is also made of dies for embossing metal signs, checks, badges and name plates and brass and bronze signs. All of these are illustrated and briefly described, and there are a number of reproductions of different stamps that are furnished for various purposes.

Punch Press Safety Device.—Yale & Towne Mfg. Company, 9 East Fortieth street, New York. Pamphlet calls attention to a safety device for power punching presses, which has been installed on a number of machines in the company's shop. The purpose of the pamphlet is to acquaint the general public with a device which is not patented and can be made by any shop for its own use. A description of the device with an engraving of the various parts is given, as well as a number of halftones, showing it installed and in operation on a press.

Jacks.—Duff Mfg. Company, Pittsburgh, Pa. Catalogue No. 102. Size, 6 x 9 in.; pages, 144. Illustrations and descriptive matter explain the construction and use of a wide line of jacks of the ball bearing screw and forged steel hydraulic styles. In general, a single page is given to each type of jack, and an engraving is presented together with a brief description and condensed table of specifications. General instructions concerning the use of the hydraulic jack are given, and this is supplemented by a sectional view of the jack. A number of new styles, designed for track work and for lifting cars have been added. Mention is also made of a line of trench braces.

Railway Ditchers, Locomotive Crane Pile Driver and Buckets.—Browning Company, Cleveland, Ohio. Three bulletins. The first, No. 10, mentions a six-cylinder railway ditching machine, which is provided with separate rotating, hoisting and traveling engines. No. 11 describes a locomotive crane pile driver, for which the special advantages of efficiency in pile driving, quick erection and detachment and rapid lowering to the minimum clearance, are claimed. In bulletin No. 12 a number of engravings are presented of the company's reeved bucket in use for handling a great variety of material. In addition to handling standard materials, they can also be used for substances that have formerly been handled by a sling or a hook block. In this bulletin, as well as in the first one, there is practically no text, the entire four pages being given over to engravings.

Steel Taped Cable.—Simplex Wire & Cable Company, 201 Devonshire street, Boston, Mass. Booklet. Describes briefly the manufacture and uses of the cable for ornamental lighting systems, parks, grounds of public buildings and in railroad and manufacturing yards where overhead wires cannot be used and a conduit system is too expensive. The cable, which is of the ordinary lead covered variety, is protected by two steel tapes wound on spirally in reverse directions, there being a serving of tarred jute between the lead sheath and the tape and also on the outside of the tape. The methods of installation are illustrated and briefly described and figures are given showing how the cost of underground wiring has been materially reduced in a number of actual installations.

Link Belt and Sprocket Wheels—Link-Belt Company, Chicago, Ill. Section A of catalogue No. 110. Size, 6 x 9 in.; pages, 112. Contains a set of practically full size illustrations of the various standard and special sizes of Ewart detachable link-belt. In connection with the engravings a new departure has been made in that the average ultimate strength of each size is given instead of the working load. A rule is given, however, by which the working load of the chain can be determined. A number of attachments are illustrated, and in addition there is a list of other attachments which are not illustrated but are similar to those which are. Instructions on the installation of the chain belt are given, together with a table of prices of the attachments and the different sprocket wheels that are furnished.

Mandrel Presses.—G. T. Eames Company, Kalamazoo, Mich. Circular. Devoted to a line of mandrel presses which are built in a number of different sizes with a view to producing a tool for all kinds of service requiring pressure up to 25 tons and a centering capacity up to 37 in. A view of some of the various sizes is presented, together with a brief table of specifications. One of the special features of the presses is the great leverage that can be secured, and mention is made of the different ways in which it is obtained in the several sizes. An illustrated description of one of these presses appeared in *The Iron Age*, February 8, 1912.

High Power Lamps—Westinghouse Lamp Company, 1261 Broadway, New York City. Form No. A-53. Illustrates and describes a new Mazda lamp, which is made in 750 and 1000 watt sizes and is intended for lighting large areas. The lamps are designed for use on either direct or alternating current circuits, where the voltage ranges between 100 and 130 volts, and it is recommended that they be used with either indirect or semi-indirect lighting fixtures. A number of views of buildings in which they have been installed are included.

Cold Drawn Steel.—Peerless Drawn Steel Company, Massillon, Ohio. Catalogue. Describes and lists a line of cold drawn steel products in round, square, flat and special shapes, with illustrations of the last. Alloy steels in standard and special shapes are listed, as well as a complete line of drill rods.

Heat Treating Furnaces.—Tate, Jones & Co., Inc., Empire Building, Pittsburgh, Pa. Catalogue. Embodies a discussion of the principles underlying the design of heat treating furnaces with illustrations and brief descriptions of a line for annealing, hardening and tempering steel and heat treating operations of various kinds. In connection with the description of the furnaces, views are given of installations of the different types and mention is made of the burners and other appliances and accessories that can be supplied. Information on the equipping of a small heat treating department is included.

Boiler Graphite.—United States Graphite Company, Saginaw, Mich. Pamphlet. Contains a report of a series of tests made to determine the efficiency of graphite as a preventative of the formation of scale in boilers and a number of testimonial letters from power plants in which it has been used.

Lubricant.—Lumen Bearing Company, Buffalo, N. Y. Pamphlet. Refers to a new lubricant known as Lesoyl, which is a semi-fluid concentrate containing graphite. It is designed to insure the perpetual suspension of graphite when mixed with lubricating oil or grease and can be used for lubricating all manner of surfaces. The special advantages claimed for it are an increased life and lubricating value of the oil employed, with a resulting economy that frequently reduces the oil bills over half. A brief description of the lubricant and its advantages is given.

Milling Machines.—Newton Machine Tool Works, Inc., Twenty-third and Vine streets, Philadelphia, Pa. Catalogue No. 48. Gives general description and specifications for a line of horizontal milling machines which have been developed for a number of different uses. The illustrations include views of the machines to supplement the description in the front of the catalogue, as well as a number of engravings showing the machines installed in various shops. Engravings of some of the other machines built by this company, which include portable slotting, link grinding, cylinder and valve chamber boring, vertical milling, rotary planing and metal sawing machines are presented.

Industrial Locomotives.—Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. Leaflet No. 3723. Describes the industrial locomotives built by this company in conjunction with the Baldwin Locomotive Works. A number of views of the locomotives in use and a description of their characteristics are included.

Ball Valves.—Pratt & Cady Company, Inc., Hartford, Conn. Circular. Illustrates and describes briefly the Farrell patent ball valve, which contains a ball of hard rolled brass or non-corrodible nickel steel, in place of the ordinary disk. This is held loosely by a claw revolving freely on a flange on the end of the spindle, which bears directly on the upper surface of the ball. In this way the ball is revolved when the valve is opened or closed and an ever changing point of contact between the ball and the valve seat is insured. A sectional view, showing the construction of the valve is included.